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Air Resources Interim Report for October 1980 through December 1981

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FLATHEAD RIVER BASIN
ENVIRONMENTAL IMPACT STUDY

Air Resources Interim Report for
October 1980 through December 1981

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I. INTRODUCTION

Recognizing the need to protect the high quality environment of the Flathead River Basin, Congress in 1977 directed the Environmental Protection Agency (EPA) to study possible environmental impacts of resource development in the Flathead River Basin. In response the EPA cooperated with state and local government bodies and interested individuals to establish the Flathead River Basin Environmental Impact Study.

The Flathead Study is directed by a 15-member Steering Committee composed of a representative of EPA, state government, the Confederated Salish-Kootenai Tribal Council, local governments, area citizens, and several federal agencies. The overall goal of the Steering Committee, and of the Flathead Study itself, is to provide a data base to help citizens, government and industry in the Flathead River Basin make decisions concerning the environment. More specifically, the Study will develop the analytical ability to assess potential impacts and provide necessary management tools to control the various levels, types, and locations of developmental activity.

The Air Quality Bureau (AQB) was requested by the Steering Committee early in 1978 to assess the need for additional air quality studies and prepare a proposal for the air quality work. The AQB identified five specific goals or needs for the Flathead Basin air quality studies. These goals were:

1. To quantify the existing air quality within the Basin;
2. To identify existing levels and sources of air pollution which affect the Basin;
3. To quantify the meteorology of the Basin at both low and high altitudes;

4. To develop the capability to assess the effects of man's activities upon the air quality of the Basin; and

5. To develop guidelines to protect and enhance the air quality of the Basin.

A brief chronology of the study's progress follows:

During the initial year of study, June 1978 through June 1979, the upper air meteorological system that had been operating at the Glacier International Airport (GIA) continued to function. Two surface wind stations also were installed and operated in the area. A contracting meteorologist was hired to handle the instrument operation and data analysis. The following sites were monitored with the samplers listed during 1978:

Moose City (Canadian border) (see Figure 1)

- high volume sampler, (total suspended particulate, sulfate and nitrate)

Polebridge

- dichotomous sampler (particulate sizing instrument)
- surface wind station
- temperature

Kalispell--Glacier International Airport (GIA)

- pilot balloon program (upper level wind flow)
- temperature sonde system (inversion heights and temperature lapse rate)
- acoustic sounder (relative stability, mixing heights, and inversion heights)
- surface meteorological system (pressure, wind, temperature, dewpoint)
- nephelometer (visibility)
- pyranometer (two wavelengths - total solar radiation)
- pyrheliometer (two wavelengths - direct solar beam)
- dichotomous sampler

Ronan

- high volume sampler

Polson

- dichotomous sampler
- surface wind system

Several other AQB monitoring sites were continued in operation:

Columbia Falls area

- high volume samplers (two), surface wind system

Kalispell

- high volume sampler

During 1979 the various samplers started during 1978 were continued except for the high volume air sampler at Moose City, which was shut down due to the lack of easy access and power. In addition high volume air samplers were installed at the Glacier International Airport, Polson, and Bigfork sites, and particle size instruments were installed adjacent to the high volume samplers in Kalispell and Columbia Falls. These instruments provided valuable data on the amount of respirable and non-respirable suspended particulate in the air. In November 1979 the surface wind system at Columbia Falls was moved to Bigfork. A report that summarized the data collected through June 1979 was prepared in September 1979.

In 1980 data collection continued at all sites. The pyrheliometers at GIA were removed, the Kalispell-Strom site sampler was re-located to the Universal Athletics building, and a new high-volume air sampler site was installed in the Evergreen area between Kalispell and the Airport. A second upper air monitoring site with pilot balloons, temperature sondes, an acoustic sounder, and a surface wind system was installed at Ninepipe National Wildlife Refuge near Ronan in the fall of 1980. Balloon flights commenced January 5, 1981. A high-volume sampler and a dichotmous sampler were also installed at the site. The Ronan-Ninepipe site is being operated in cooperation with the Salish-Kootenai air monitoring office. The upper air information collected at the Ronan-Ninepipe site allowed comparisons to be made between the northern and southern ends of the Basin.

A detailed inventory of area and point sources of particulate and SO_2 air pollution in the Basin was prepared. The source emission inventory was submitted to the Steering Committee in June 1980.

A report summarizing data through September, 1980 was presented to the Steering Committee in June, 1981.

During 1981 the dichotomous sampler at Polebridge was replaced with a high volume air sampler and an additional high volume air sampler was installed in Whitefish.

The 1981 sampling network included:

Polebridge

- surface wind system with temperature
- high volume air sampler

Columbia Falls

- two high volume air samplers
- dichotomous sampler

Whitefish

- high volume air sampler

Glacier International Airport (GIA)

- pilot balloon program
- temperature sonde system
- acoustic sounder
- surface wind system with temperature
- nephelometer

- pyranometers (two wavelengths)
- high volume air sampler
- dichotomous sampler

Evergreen

- high volume air sampler

Kalispell

- high volume air sampler
- dichotomous sampler

Big Fork

- high volume air sampler
- surface wind system with temperature

Polson

- high volume air sampler
- dichotomous air sampler
- surface wind system with temperature

Ninepipe Wildlife Refuge

- pilot balloon program
- temperature sonde system
- acoustic sounder
- nephelometer
- surface wind system
- high volume air sampler
- dichotomous sampler

This report summarizes the majority of the air quality data collected through December 1981 and analyzes the meteorological data collected at the Glacier International Airport site and the Ninepipes site in 1981.

II. AMBIENT AIR QUALITY

A. Particulates

Two methods of particulate monitoring have been used in the Flathead Basin Study since its inception. The first method uses a high volume air sampler (hi-vol). This sampler draws ambient air through a pre-weighed glass fiber filter at a known rate of flow for twenty-four hours (from midnight to midnight) every six days. The filter is reweighed after exposure and the difference between the sample and tare weight of the filter is divided by the volume of air sampled to calculate the concentration of particulate in micrograms per cubic meter. The filter used is highly efficient for particles down to .01 microns. The hi-vol shelter construction imposes an upper size limit of 200 microns barring wind effects, and has a 50 percent cut-off for 40 micron particles. This large size range of collected particulates that were suspended in the air (or falling relatively slowly) is the basis of the term "total suspended particulate" which is used to describe hi-vol results. Total suspended particulate (TSP) levels were monitored at five sites in the Basin in 1978, at eight sites in 1979, at nine sites in 1980, and at ten sites in 1981 (Table 1, page 13). The map (Figure 1) shows the location of sampling sites used in the Flathead Basin Study.

Table 1 summarize the TSP levels at all sites for the years 1978, 1979, 1980, and 1981. The values listed for each site are highest and second highest TSP levels for the year and the arithmetic average. The data clearly shows the influence of population density, industrial and agricultural activities on TSP concentrations. The lowest concentrations are at the Moose City, Polebridge, Columbia Falls - NAAC, and Ninepipe sites, while the highest levels are at the

Columbia Falls-Anders and Kalispell-Universal Athletic sites. Annual average concentrations for these last two were above the Montana standard of 75 micrograms per cubic meter in 1980 and 1981.

Tables 2-A through 2-M show monthly trends in TSP levels at the hi-vol sites. These levels are also presented graphically in Figures 2-A through 2-BB. The sites with low levels of TSP show a moderate but persistent seasonal pattern with higher levels in the summer. The sites with high average concentrations show quite significant changes with a peak during late winter and early spring, and another peak during summer and early fall. Lower levels are prevalent during late fall, winter, and late spring.

Fine particulate levels in the Flathead Basin were measured using dichotomous samplers. Results of these measurements were reported earlier (Coefield, 1981 and Gelhaus, 1979)

B. Sulfates and Nitrates

Sulfate and nitrate analyses were performed on the filters from the high volume samplers from all sites except Kalispell-Evergreen. Monthly arithmetic means and maximums of sulfate and nitrate are presented in Tables 2-A through 2-M along with the TSP values. The values are generally highest in the more urban or industrialized areas and lowest in the rural areas. The highest value (12.8 micrograms/cubic meter) was recorded at the Columbia Falls-NAAC site in February 1978. This site has sulfate values similar to those at the Columbia Falls-Anders site even though the TSP levels are only about one fifth as high. This is probably due to the Aluminum plant nearby. 1981 sulfate levels at the Polebridge site were second only to the Kalispell-Universal Athletics site and were unusually high for such a remote site. These high levels were probably caused by emissions from the gas fields 50 miles northeast of the site in Alberta.

The nitrate levels were uniformly lower than the sulfate levels but exhibited much the same pattern. The highest nitrate level recorded was 10.9 micrograms per cubic meter in February, 1980 at the Kalispell-Universal Athletics site. The lowest nitrate value recorded was 0.0 micrograms per cubic meter at the Polebridge site.

C. Visibility

Montana has a visibility standard for PSD Class I areas based on integrating nephelometer measurements. The nephelometer measures a dimensionless scattering coefficient over a one meter light path using an artificial light source. The Montana standard requires an annual mean value no more than 3.0×10^{-5} for Class I areas. Although the Flathead Basin Study area does include Class I areas (Glacier National Park, Bob Marshall Wilderness, and Mission Mountain Wilderness), no nephelometer measurements were taken in those areas due to logistical considerations. Visibility measurements were taken at two locations in the study area: Glacier International Airport (GIA) north of Kalispell, and Ninepipes Wildlife Refuge south of Ronan. The nephelometer at GIA has been in place since 1978 and values for these earlier years were listed in a previous report. A second nephelometer has been operating at the Ninepipes site since July 1981. Table 3 compares the nephelometer data from the GIA site and the Ninepipes site during the second half of 1981.

Visibility at the Ninepipes site was noticeably better than that at GIA throughout the period, particularly during the late fall and winter when wood smoke traditionally is a problem.

III. METEOROLOGY

A. Upper Air

In the fall of 1980, a new monitoring site was set up at the Ninepipes Wildlife Refuge 5 miles south of Ronan. Measurements of upper air meteorology have been made at this site since January 1981 in conjunction with the upper air work being done at the Glacier International Airport site north of Kalispell. This allowed a direct comparison to be made of the winds aloft and stability characteristics of the north and south ends of the Flathead Basin. Acoustic sounders operated continuously at both sites to measure inversion heights and stability at the two sites. Pilot balloons with attached temperature sensors were launched and tracked from each site in the morning and afternoon three times a week. Wind speed and direction at 10 meters was also collected at both sites.

The south end of the Basin is considerably broader than the north end and is mostly unforested. Pasture land and cropland are the predominate land types around the monitoring site. East of the site the topography is essentially the same, a high range of mountains abruptly rising to 1500 meters in 15 kilometers. In the north the eastern ridge is about 1200 meters high and is 12 kilometers away. To the west the terrain in the south is considerably different, rising slowly with rolling hills to a ridge 750 meters high 32 kilometers away. At the northern site a substantial range of mountains rise abruptly to 900 meters 27 kilometers west.

These topographical differences between the two sites influence the upper air flow in a noticeable way. Tables 4A to 4N and 5A to 5K present upper air summaries for the two sites on days when balloons were launched from both sites and were tracked successfully to at least 1500 meters. For days when comparisons were made mixing heights at the Kalispell site averaged 23 percent higher in the morning and 15 percent higher in the afternoons. The wind speeds through these mixed layers were faster above the Kalispell site than the Ninepipes site. Average wind speed through the mixed layer was 13 percent faster above Kalispell in the morning and 33 percent faster in the afternoon. The winds at 1500 meters however, do not exhibit such a clear pattern. Winds at this level averaged 26 percent slower above the Ninepipes site in the morning, but 12 percent faster in the afternoon. The wind directions at this height for both sites were predominately from the south through west in the mornings and from the south through southwest in the afternoons. Generally, when wind speeds are greater than 4 m/s the winds at both sites are from the same quadrant at this level.

It is clear from this analysis that there is a slightly greater pollutant dispersion potential in the north end of the Basin than the south end. However, since the potential volume available for dispersion is usually restricted by the physical size of the valley the narrower north end does not really have any significant advantage except for short-term episodes.

B. Acoustic Sounder

Acoustic sounders have been operated at the Glacier International Airport site since 1976 and at the Ninepipes site since December 1980.

The monostatic acoustic sounder (or acoustic radar) consists of a transmit/receive dish antenna approximately four feet in diameter and a recording/display unit which produces a permanent chart record. Approximately every 22 seconds the antenna emits a 1600 Hz sound pulse. The pulse is directed vertically upward and is reflected downward to the receiver if stable layers or inversions are present, by small-scale turbulence and temperature discontinuities associated with inversions. The echoes received are recorded electrically on heat-sensitive chart paper. The chart produced is interpreted by the operator, who obtains from it a stability estimate (stable, unstable, or neutral) of the lowest 100 meters of the atmosphere, and the height, thickness, and type of any inversion(s) present. These data are further analyzed by computer, and monthly summaries of first (lowest) and second (second lowest if multiple inversions are present) inversions are produced. A two-hour stability analysis is also performed, which assigns data into one of six stability categories, A through F, where A is the most unstable and F is the most stable. These classifications are based on the operator's stability estimate plus wind speed, time of day, solar altitude angle, and cloud conditions. A more complete discussion of the procedure followed can be found in a report published by the Air Quality Bureau (Gelhaus, 1979).

Tables 6 and 7 present a comparison of acoustic sounder data from the Glacier International Airport site and the Ninepipes site. Table 6 summarizes first inversion occurrence, base height and thickness by month for the two sites.

During the nighttime hours (0001-0600 MST) a surface based inversion 301 to 500 meters thick was present virtually every day of the year at the GIA site. These persistent inversions were also presnt almost every day at the Ninepipes site during the late fall and winter months. During March through September the Ninepipes site experienced these inversions more than half the time but did record significant periods with no inversion present. This may be due to the lack of forest cover at this end of the basin which would allow surface soil layers to build up enough residual heat on a sunny day to stay warm through short summer nights and prevent the formation of a typical radiation inversion.

During the morning (0601-1200 MST) hours a seasonal variation is apparent at both sites. Late fall and winter months again show persistent surface based inversions from 101 to 500 meters thick present at both sites almost all of the time. During the spring and summer months these inversions are not as prevalent and are based 100 to 200 meters above the surface. Again the GIA site has a higher overall frequency of occurrence than the Ninepipes site.

During the afternoon (1201-1800 MST) hours inversions are present less than half the time except for November through January when inversions often persist throughout the day at both sites. These afternoon inversions are usually elevated several hundred meters.

The evening (1801-2400 MST) hours again have surface based inversions 100-500 meters thick present virtually every day at the GIA site and slightly less frequently during the spring and summer months at the Ninepipes site.

The percent frequency of occurrence of stability classifications for the lower 100 meters for each site is presented by month in Table 7. Stability at the Ninepipes site does not appear to be significantly different than that of the GIA site. Both have a strong preponderance of neutral or stable classes (Classes D, E or F) most of the year with a tendency toward slightly unstable (Class C) during the spring and summer months.

TABLES

TABLE 1

Flathead Basin TSP Levels
Maximums, (Second High Reading), and [Arithmetic Average]*

Site	1978 Max(2nd)[Ave]	1979 Max(2nd)[Ave]	1980 Max(2nd)[Ave]	1981 Max(2nd)[Ave]
Moose City	40 (18)[15]	15 (12)[10]		
Polebridge				89 (62)[30]
Columbia Falls NAAC	59 (56)[25]	64 (63)[29]	106 (81)[30]	89 (83)[30]
Columbia Falls-Anders	425 (423)[134]	484 (390)[145]	498 (455)[129]	494(390)[148]
Whitefish				144(128) [73]
Kalispell-GIA		140 (120)[56]	309 (232)[62]	134(103) [39]
Kalispell-Strom	110 (105)[65]	343 (289)[90]		
Kalispell-Universal Athletic			296 (202)[103]	211(186) [90]
Kalispell-Evergreen			169 (138)[67]	170(159) [65]
Bigfork		112 (103)[43]	134 (102)[42]	109 (84) [32]
Polson		202 (191)[80]	177 (159)[62]	174(111)[44]
Ronan	170 (120)[48]	405 (311)[109]	220 (175)[88]	
Ninepipes			42 (35)[21]	142 (55)[24]

*All values in micrograms per cubic meter

TABLE 2-A

Moose City
Particulate Data*
Total Suspended Particulates, TSP
Sulfates (SO_4) and Nitrates $[NO_3]$
September 1978 - March 1979

Month	Arithmetic Mean TSP	Arithmetic Mean (SO_4)	Arithmetic Mean $[NO_3]$	Maximum Reading TSP	Maximum Reading (SO_4)	Maximum Reading $[NO_3]$
Sept. 78	16	(1.6)	[0.4]	18	(2.4)	[0.6]
Oct.	26	(1.6)	[0.2]	40	(1.9)	[0.2]
Nov.						
Dec.	9	(4.5)	[0.3]	17	(6.1)	[0.4]
Jan 79						
Feb	10	(2.9)	[0.2]	12	(4.2)	[0.3]
Mar	10	(2.6)	[0.3]	15	(4.0)	[0.4]

*All values in micrograms per cubic meter

TABLE 2-B

Polebridge
Particulate Data*
Total Suspended Particulates, TSP
Sulfates (SO_4) and Nitrates [NO_3]
June 1981 - December 1982

	Arithmetic Mean			Maximum Reading		
Month	TSP	(SO_4)	[NO_3]	TSP	(SO_4)	[NO_3]
May 81	24	(4.5)	[0.1]	24	(4.5)	[0.1]
June	28	(3.5)	[0.0]	47	(4.3)	[0.1]
July	43	(3.5)	[0.1]	62	(3.7)	[0.2]
Aug	57	(3.2)	[0.2]	89	(4.9)	[0.3]
Sep	25	(3.0)	[0.1]	33	(4.3)	[0.3]
Oct	21	(4.1)	[0.3]	29	(4.9)	[0.4]
Nov	17	(2.3)	[0.1]	30	(3.1)	[0.3]
Dec	10	(1.0)	[0.0]	10	(1.0)	[0.0]

TABLE 2-C

Columbia Falls - NAAC
Particulate Data *
Total Suspended Particulates, TSP
Sulfates (SO_4) and Nitrates [NO_3]
January 1978 - December 1981

	Arithmetic Mean			Maximum Reading		
Month	TSP	(SO_4)	[NO_3]	TSP	(SO_4)	[NO_3]
Jan 78	23	(4.5)	[2.0]	55	(9.6)	[5.6]
Feb	24	(6.2)	[1.1]	47	(12.8)	[2.4]
March	33	(3.1)	[1.6]	42	(6.4)	[2.3]
April	13	(2.4)	[0.4]	21	(3.4)	[0.6]
May	26	(2.6)	[0.5]	46	(4.5)	[1.0]
June	21	(2.3)	[0.3]	33	(3.3)	[0.5]
July	28	(2.7)	[0.5]	48	(4.1)	[0.8]
Aug	29	(3.4)	[0.5]	37	(5.2)	[0.6]
Sep	26	(2.9)	[0.6]	30	(4.6)	[0.9]
Oct	39	(2.8)	[0.6]	59	(5.0)	[1.0]
Nov	24	(3.7)	[1.3]	53	(9.1)	[3.2]
Dec	8	(1.9)	[0.7]	16	(3.5)	[1.8]
Jan 79	32	(5.0)	[1.8]	48	(7.1)	[2.9]
Feb	27			50		
March	21			37		
Apr	22			63		
May	28			44		
June	29			35		
July	30			42		
Aug	32			57		
Sept	33			43		
Oct	33			49		
Nov	34			60		
Dec	31			64		
Jan 80	24			35		
Feb	20			43		
March	17			21		
April	18			28		
May	24			45		
June	31			53		
July	41			81		
Aug	31			53		
Sept	44			65		
Oct	56			106		
Nov	22			56		
Dec	23			38		
Jan 81	34			57		
Feb	18			33		
Mar	15			27		
Apr	20			40		
May	19			25		
June	28			51		
July	49			89		
Aug	49			79		
Sep	47			83		
Oct	30			39		
Nov	36			54		
Dec	24			37		

*All values in micrograms per cubic meter

TABLE 2-D

Columbia Falls - Anders
Particulate Data*
Total Suspended Particulates (TSP)
Sulfates (SO_4) and Nitrates [NO_3]
January 1978 - December 1981

	Arithmetic Mean			Maximum Reading		
Month	TSP	(SO_4)	[NO_3]	TSP	(SO_4)	[NO_3]
Jan 78	47	(5.1)	[2.3]	78	(9.2)	[5.6]
Feb	80	(5.3)	[1.5]	209	(9.9)	[4.0]
March	292	(3.3)	[1.7]	426	(5.1)	[2.2]
April	137	(2.9)	[0.5]	328	(3.9)	[1.0]
May	157	(2.9)	[0.6]	208	(3.8)	[1.1]
June	117	(2.8)	[0.5]	208	(5.0)	[0.8]
July	154	(3.4)	[0.6]	311	(4.8)	[0.9]
Aug	177	(4.0)	[0.7]	375	(5.2)	[1.4]
Sep	137	(2.9)	[0.8]	186	(4.7)	[1.2]
Oct	165	(3.1)	[1.0]	249	(4.8)	[1.5]
Nov	102	(5.7)	[2.8]	152	(8.2)	[5.1]
Dec	35	(3.1)	[1.6]	58	(4.4)	[4.1]
Jan 79	40	(6.1)	[2.7]	113	(8.3)	[3.7]
Feb	51			79		
Mar	169			353		
April	174			257		
May	205			375		
June	186			261		
July	161			254		
Aug	119			210		
Sep	240			279		
Oct	207			484		
Nov	112			212		
Dec	48			84		
Jan 80	83			188		
Feb	48			81		
March	108			140		
April	139			225		
May	73			122		
June	82			125		
July	189			455		
Aug	131			206		
Sept	175			267		
Oct	241			422		
Nov	104			235		
Dec	159			498		
Jan 81	91			197		
Feb	146			222		
Mar	157			369		
April	150			390		
May	122			308		
June	108			252		
July	319			404		
Aug	167			231		
Sep	179			292		
Oct	144			312		
Nov	113			242		
Dec	74			135		

*All values in micrograms per cubic meter

TABLE 2-E

Whitefish
Particulate Data*
Total Suspended Particulates, TSP
Sulfates (SO_4) and Nitrates $[NO_3]$
August 1981 - December 1981

	Arithmetic Mean			Maximum Reading		
Month	TSP	(SO_4)	$[NO_3]$	TSP	(SO_4)	$[NO_3]$
Aug 81	74	(3.0)	[0.9]	105	(3.3)	[1.3]
Sep	65	(2.8)	[0.7]	96	(4.7)	[0.9]
Oct	81	(3.2)	[1.1]	106	(4.3)	[1.3]
Nov	83	(1.7)	[1.3]	144	(3.0)	[2.0]
Dec	62	(1.6)	[1.2]	84	(2.8)	[1.6]

TABLE 2-F

Glacier International Airport
Particulate Data*
Total Suspended Particulates TSP
Sulfates (SO_4) and Nitrates [NO_3]
March 1979 - December 1981

	Arithmetic Mean			Maximum Reading		
Month	TSP	(SO_4)	[NO_3]	TSP	(SO_4)	[NO_3]
Mar 79	79	(3.2)	[2.8]	120	(4.5)	[5.6]
April	50	(2.3)	[1.1]	117	(4.0)	[1.6]
May	53	(2.2)	[0.9]	74	(3.3)	[1.1]
June	54	(2.0)	[0.9]	69	(2.2)	[1.3]
July	67	(2.3)	[0.8]	89	(2.9)	[1.0]
Aug	61	(2.5)	[0.8]	109	(2.9)	[1.6]
Sep	73	(2.5)	[1.0]	107	(3.2)	[1.2]
Oct	73	(3.1)	[1.5]	140	(3.8)	[1.8]
Nov	38	(3.8)	[2.1]	57	(5.0)	[3.6]
Dec	25	(2.4)	[1.6]	34	(2.9)	[3.0]
Jan 80	36	(3.9)	[2.2]	45	(5.3)	[2.9]
Feb	38	(3.5)	[3.1]	67	(6.4)	[4.0]
Mar	23	(2.2)	[0.9]	33	(3.5)	[1.6]
April	50	(3.2)	[0.6]	88	(4.5)	[1.0]
May	41	(2.5)	[0.4]	46	(3.8)	[0.6]
June	86	(3.0)	[0.6]	232	(4.9)	[0.8]
July	74	(3.5)	[0.3]	138	(4.8)	[0.7]
Aug	89	(3.8)	[0.3]	230	(4.8)	[0.6]
Sep	90	(4.0)	[0.5]	142	(6.2)	[0.8]
Oct	112	(4.1)	[1.3]	309	(4.8)	[1.8]
Nov	40	(3.0)	[1.2]	78	(4.1)	[2.5]
Dec	34	(4.7)	[1.2]	45	(7.7)	[1.8]
Jan 81	35	(3.8)	[1.9]	51	(5.9)	[3.1]
Feb	30	(3.5)	[0.8]	42	(6.6)	[1.5]
Mar	25	(1.8)	[0.9]	53	(3.7)	[2.0]
April	25	(2.0)	[0.6]	38	(2.3)	[0.9]
May	28	(2.5)	[0.4]	65	(3.6)	[0.6]
June	29	(1.8)	[0.3]	60	(2.5)	[0.6]
July	52	(2.1)	[0.5]	84	(2.5)	[0.7]
Aug	75	(3.3)	[1.0]	134	(3.5)	[1.6]
Sep	60	(2.4)	[0.8]	103	(3.2)	[1.2]
Oct	44	(3.2)	[1.1]	71	(5.1)	[1.4]
Nov	39	(1.0)	[1.3]	91	(2.3)	[2.1]
Dec	26	(2.3)	[1.8]	51	(5.5)	[3.0]

*All values in micrograms per cubic meter

TABLE 2-G

Kalispell - Strom
Particulate Data*
Total Suspended Particulates, TSP
Sulfates (SO_4) and Nitrates [NO_3]
October 1978 - December 1979

	Arithmetic Mean			Maximum Reading		
Month	TSP	(SO_4)	[NO_3]	TSP	(SO_4)	[NO_3]
Oct 78	85	(3.5)	[1.0]	110	(3.9)	[1.2]
Nov	67	(5.8)	[2.5]	99	(8.2)	[4.8]
Dec	43	(4.6)	[1.6]	63	(5.0)	[3.2]
Jan 79	41	(7.6)	[3.0]	59	(8.5)	[4.1]
Feb	58	(5.3)	[3.9]	59	(6.4)	[6.6]
March	164	(4.8)	[2.7]	343	(7.0)	[4.0]
April	147	(4.6)	[1.5]	184	(4.9)	[1.8]
May	107	(2.4)	[1.0]	135	(2.8)	[1.3]
June	63	(2.4)	[0.9]	76	(2.8)	[1.0]
July	95	(2.7)	[0.7]	140	(3.0)	[1.1]
Aug	73	(2.9)	[0.7]	156	(3.6)	[1.3]
Sep	126	(3.7)	[1.2]	208	(6.3)	[2.3]
Oct	-	-	-	-	-	-
Nov	87	(6.0)	[2.9]	136	(9.1)	[5.4]
Dec	67	(3.0)	[1.8]	110	(3.6)	[2.9]

*All values in micrograms per cubic meter

TABLE 2-H

Kalispell - Evergreen Elec.
Particulate Data*
Total Suspended Particulates, TSP
Sulfates (SO_4) and Nitrates $[NO_3]$
June 1980 - December 1981

	Arithmetic Mean			Maximum Reading		
Month	TSP	(SO_4)	$[NO_3]$	TSP	(SO_4)	$[NO_3]$
June 80	54			91		
July	78			135		
Aug	58			100		
Sept	103			169		
Oct	84			138		
Nov	51			89		
Dec	51			65		
Jan 81	43			75		
Feb	71			152		
Mar	50			95		
Apr	57			113		
May	42			90		
June	91			170		
July	86			110		
Aug	99			159		
Sep	72			139		
Oct	88			151		
Nov	50			92		
Dec	30			46		

*All values in micrograms per cubic meter

TABLE 2-I

Kalispell - Universal Athletics
Particulate Data*
Total Suspended Particulates, TSP
Sulfates (SO_4) and Nitrates [NO_3]
January 1980 - December 1981

	Arithmetic Mean			Maximum Reading		
Month	TSP	(SO_4)	[NO_3]	TSP	(SO_4)	[NO_3]
Jan 80	92	(5.3)	[2.0]	137	(6.4)	[2.5]
Feb	72	(4.8)	[5.7]	126	(6.4)	[10.9]
March	169	(4.4)	[1.3]	197	(5.7)	[2.5]
April	116	(4.0)	[0.4]	192	(5.1)	[0.8]
May	119	(4.0)	[0.5]	150	(5.2)	[0.6]
June	81	(2.5)	[0.5]	95	(2.8)	[0.6]
July	93	(3.2)	[0.6]	137	(4.8)	[0.9]
Aug	81	(4.9)	[0.1]	114	(6.5)	[0.5]
Sep	142	(5.7)	[1.2]	202	(7.1)	[1.7]
Oct	91	(4.0)	[1.3]	130	(5.6)	[1.8]
Nov	92	(5.9)	[1.5]	148	(8.8)	[2.4]
Dec	133	(5.5)	[1.3]	296	(6.1)	[2.0]
Jan 81	95	(5.8)	[1.9]	174	(8.0)	[3.7]
Feb	106	(6.1)	[0.7]	211	(7.9)	[0.8]
Mar	121	(3.5)	[1.1]	177	(4.2)	[1.5]
Apr	75	(3.9)	[0.7]	107	(4.5)	[1.2]
May	72	(4.0)	[0.6]	88	(5.1)	[0.8]
June	89	(4.6)	[0.5]	138	(5.3)	[0.6]
July	67	(3.0)	[0.6]	87	(3.4)	[0.7]
Aug	108	(4.2)	[1.0]	86	(4.8)	[1.3]
Sep	99	(4.1)	[1.0]	163	(5.8)	[1.2]
Oct	85	(5.2)	[1.3]	133	(6.5)	[2.1]
Nov	116	(2.9)	[1.8]	180	(3.7)	[3.8]
Dec	57	(3.5)	[2.2]	70	(4.4)	[3.1]

*All values in micrograms per cubic meter

TABLE 2-J

Bigfork
Particulate Data*
Total Suspended Particulates, TSP
Sulfates (SO_4) and Nitrates [NO_3]
July 1979 - December 1981

	Arithmetic Mean			Maximum Reading		
Month	TSP	(SO_4)	[NO_3]	TSP	(SO_4)	[NO_3]
Jul 79	54	(2.4)	[0.5]	67	(2.9)	[0.6]
Aug	47	(2.3)	[0.5]	103	(2.7)	[0.6]
Sept	38	(2.7)	[0.7]	53	(4.0)	[0.9]
Oct	42	(2.9)	[1.2]	57	(3.4)	[1.5]
Nov	40	(4.1)	[2.2]	47	(4.8)	[4.9]
Dec	41	(3.3)	[1.3]	112	(3.9)	[2.3]
Jan 80	60	(5.1)	[2.3]	102	(8.0)	[3.9]
Feb	40	(3.7)	[1.2]	88	(5.5)	[1.6]
March	27	(3.5)	[0.4]	35	(6.5)	[0.8]
April	37	(3.1)	[0.4]	67	(5.2)	[0.8]
May	28	(2.7)	[0.6]	32	(3.2)	[0.8]
June	29	(2.4)	[0.2]	44	(3.2)	[0.4]
July	42	(2.4)	[0.7]	81	(2.8)	[1.4]
Aug	33	(3.5)	[0.1]	52	(5.8)	[0.3]
Sep	51	(3.2)	[0.4]	93	(4.2)	[0.8]
Oct	45	(4.1)	[1.1]	63	(5.0)	[1.9]
Nov	38	(4.6)	[0.8]	44	(5.4)	[1.0]
Dec	73	(1.8)	[0.5]	134	(1.8)	[0.5]
Jan 81	35	(4.2)	[1.7]	48	(6.5)	[3.0]
Feb	36	(2.5)	[0.8]	75	(4.7)	[1.0]
Mar	26	(2.4)	[0.9]	42	(3.2)	[1.2]
April	22	(1.6)	[0.3]	37	(2.1)	[0.5]
May	21	(2.4)	[0.3]	40	(5.0)	[0.7]
June	29	(2.2)	[0.3]	56	(2.6)	[0.6]
July	37	(2.3)	[0.4]	42	(3.5)	[0.5]
Aug	57	(2.2)	[0.9]	84	(2.4)	[1.3]
Sep	49	(2.2)	[0.6]	109	(3.5)	[1.4]
Oct	26	(3.3)	[0.8]	35	(5.1)	[1.3]
Nov	29	(2.1)	[1.2]	54	(4.2)	[2.8]
Dec	20	(1.5)	[0.7]	30	(3.7)	[1.5]

*All values in micrograms per cubic meter

TABLE 2-K

Polson
Particulate Data*
Total Suspended Particulates, TSP
Sulfates (SO_4) and Nitrates $[NO_3]$
March 1979 - December 1981

	Arithmetic Mean			Maximum Reading		
Month	TSP	(SO_4)	$[NO_3]$	TSP	(SO_4)	$[NO_3]$
March 79	48	(3.3)	[2.0]	75	(5.0)	[3.3]
April	48	(2.7)	[1.2]	94	(4.0)	[1.7]
May	96	(2.7)	[0.9]	149	(3.1)	[1.2]
June	106	(2.7)	[1.0]	169	(3.6)	[1.8]
July	59	(2.2)	[0.7]	63	(2.8)	[1.0]
Aug	98	(2.4)	[0.6]	188	(2.7)	[0.8]
Sept	133	(3.2)	[1.0]	191	(4.3)	[1.3]
Oct	106	(2.9)	[1.4]	202	(3.5)	[1.6]
Nov	48	(4.6)	[3.9]	71	(6.6)	[5.4]
Dec	30	(2.7)	[1.6]	43	(3.5)	[3.4]
Jan 80	98	(4.1)	[2.1]	177	(5.4)	[3.5]
Feb	40	(3.9)	[1.5]	62	(5.0)	[2.3]
March	27	(3.8)	[0.9]	37	(5.2)	[2.8]
April	74	(3.5)	[0.9]	114	(4.5)	[1.2]
May	31	(2.7)	[0.5]	42	(3.1)	[0.8]
June	47	(3.0)	[0.4]	51	(3.2)	[0.5]
July	-	-	-	-	-	-
Aug	72	(4.8)	[0.2]	83	(6.6)	[0.7]
Sept	83	(4.9)	[0.8]	159	(6.6)	[1.2]
Oct	70	(5.1)	[1.6]	128	(6.0)	[2.6]
Nov	55	(3.6)	[1.5]	84	(4.7)	[2.5]
Dec	52	(3.1)	[0.6]	90	(3.7)	[1.7]
Jan 81	24	(2.9)	[1.7]	35	(4.6)	[3.4]
Feb	46	(3.1)	[0.9]	111	(6.2)	[1.3]
Mar	36	(2.4)	[0.8]	76	(4.0)	[1.6]
April	43	(2.3)	[0.5]	76	(2.8)	[0.6]
May	35	(2.9)	[0.6]	81	(6.6)	[1.1]
June	32	(2.5)	[0.3]	39	(3.0)	[0.4]
July	57	(2.8)	[0.7]	77	(3.1)	[0.8]
Aug	66	(2.9)	[0.8]	84	(3.4)	[1.1]
Sep	56	(3.0)	[0.8]	72	(3.8)	[0.9]
Oct	46	(3.4)	[1.0]	72	(5.2)	[1.5]
Nov	57	(1.8)	[1.6]	174	(3.5)	[3.8]
Dec	23	(1.7)	[1.4]	35	(3.8)	[2.6]

TABLE 2-L

Ronan
Particulate Data*
Total Suspended Particulates, TSP
Sulfates (SO_4) and Nitrates $[NO_3]$
November 1978 - July 1980

	Arithmetic Mean			Maximum Reading		
Month	TSP	(SO_4)	$[NO_3]$	TSP	(SO_4)	$[NO_3]$
Nov 78	85	(4.1)	[2.0]	170	(6.5)	[4.2]
Dec	19	(3.4)	[1.0]	32	(4.1)	[2.4]
Jan 79	36	(6.9)	[3.8]	58	(10.8)	[6.3]
Feb	49	(4.2)	[2.5]	64	(8.1)	[6.6]
March	76	(3.9)	[2.2]	123	(5.3)	[4.1]
April	94	(2.1)	[0.8]	168	(3.8)	[1.5]
May	130	(1.9)	[0.9]	147	(2.6)	[1.4]
June	227	(2.0)	[0.8]	311	(2.0)	[1.0]
July	204	(2.2)	[0.9]	224	(2.4)	[1.1]
Aug	140	(2.1)	[0.7]	240	(3.2)	[1.2]
Sept	176	(2.3)	[0.9]	288	(2.8)	[1.3]
Oct	137	(2.5)	[1.3]	406	(2.9)	[1.6]
Nov	27	(3.4)	[2.6]	29	(4.8)	[6.3]
Dec	53	(3.0)	[2.1]	69	(4.5)	[4.1]
Jan 80	61	(4.3)	[1.9]	140	(7.5)	[2.7]
Feb	89	(3.8)	[2.8]	168	(4.6)	[5.6]
March	88	(4.0)	[0.5]	106	(5.4)	[0.6]
April	146	(2.5)	[0.4]	220	(3.6)	[0.9]
May	56	(2.9)	[0.8]	80	(3.1)	[0.9]
June	61	(3.4)	[0.6]	88	(4.1)	[0.8]
July	74	(3.7)	[0.4]	120	(4.5)	[0.6]

*All values in micrograms per cubic meter

TABLE 2-M

Ninepipes
Particulate Data*
Total Suspended Particulates, TSP
Sulfates (SO_4) and Nitrates [NO_3]
October 1980 - December 1981

	Arithmetic Mean			Maximum Reading		
Month	TSP	(SO_4)	[NO_3]	TSP	(SO_4)	[NO_3]
Oct 80	29			42		
Nov	21	(2.8)	[1.4]	35	(2.8)	[1.4]
Dec	15	(1.6)	[0.6]	26	(1.9)	[1.0]
Jan 81	17	(2.2)	[2.0]	24	(4.0)	[3.4]
Feb	13	(2.3)	[0.8]	20	(4.9)	[1.6]
Mar	13	(1.3)	[0.5]	30	(2.6)	[1.2]
Apr	17	(1.2)	[0.4]	30	(1.5)	[0.6]
May	22	(2.0)	[0.5]	45	(4.4)	[0.9]
Jun	18	(1.4)	[0.4]	24	(1.8)	[0.5]
July	40	(1.1)	[0.6]	45	(1.2)	[0.7]
Aug	47	(1.6)	[0.7]	55	(2.1)	[1.1]
Sep	60	(1.5)	[0.7]	142	(2.0)	[1.0]
Oct	19	(1.8)	[0.7]	29	(3.2)	[1.2]
Nov	20	(1.4)	[1.0]	39	(1.7)	[1.8]
Dec	9	(0.5)	[0.8]	17	(1.2)	[3.0]

*All values in micrograms per cubic meter

TABLE 3

Visibility Data (Nephelometer)

Kalispell-GIA vs. Ninepipes
Scattering Coefficients x 10^{-5}
July 1981 - December 1981

	Mean		Maximum Day		Maximum Hour	
Month	GIA	NP	GIA	NP	GIA	NP
July	4.8	3.0	8.8	5.8	23.5	12.4
August	5.4	4.7	15.1	12.1	25.9	26.8
September	3.3		13.2		31.4	
October	9.5	5.2	26.4	15.2	39.8	43.7
November	11.6	2.1	30.1	4.4	53.5	12.6
December	9.2	3.8	25.8	13.0	43.5	29.1

TABLE 4A

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           KALISPELL UPPER AIR SUMMARY

           DATE: 810304      HOUR:  715

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

     21.4             21.4        4      4.205
    128.4            171.2        2      0.701
    545.8             53.5        2      0.561
   2011.8             74.9        1      0.400


MORNING MIXING HEIGHT:        229.3  M

 AVERAGE LAPSE RATE BELOW FIRST INVERSION IS: -4.205

 AVERAGE WIND SPEED THRU MIXED LAYER:           4.1  M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
    SFC        0.0         0.
    100.       2.7        13.
    200.       6.2        24.
    300.       5.5        37.
    500.       2.1        74.
    750.       3.8       109.
   1000.       6.0       143.
   1500.       4.6       171.
   2000.       5.5       178.
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           NINE PIPES UPPER AIR SUMMARY

           DATE: 810304      HOUR:  750

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100

      0.0            513.7        2        0.896


MORNING MIXING HEIGHT:          86.9  M
 AVERAGE WIND SPEED THRU MIXED LAYER:          2.7  M.


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
    SFC        0.9       270.
    100.       3.1       249.
    200.       2.3       244.
    300.       0.8       268.
    500.       0.7       119.
    750.       5.2       166.
   1000.       6.2       166.
   1500.       5.8       179.
   2000.       6.3       214.
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           KALISPELL UPPER AIR SUMMARY

           DATE: 810309      HOUR:  710

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

      0.0             96.3        3      2.284
    235.4            160.5        1      0.311
    524.4            246.1        2      0.853


MORNING MIXING HEIGHT:          92.9  M
 AVERAGE WIND SPEED THRU MIXED LAYER:          3.1  M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
    SFC        1.3         2.
    100.       4.3       360.
    200.       4.0       348.
    300.       6.3       341.
    500.       6.8       335.
    750.       5.0       335.
   1000.       2.2        59.
   1500.       1.3        89.
   2000.       4.5        71.
```

```
           NINE PIPES UPPER AIR SUMMARY

           DATE: 810309      HOUR:  745

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

      0.0            599.3        2        0.651


MORNING MIXING HEIGHT:         159.9  M
 AVERAGE WIND SPEED THRU MIXED LAYER:          2.1  M/

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
    SFC        0.9        80.
    100.       2.5       187.
    200.       2.0       174.
    300.       1.7       172.
    500.       2.7       156.
    750.       3.4       138.
   1000.       2.5        89.
   1500.       2.2        43.
   2000.       2.1        48.
```

```
           KALISPELL UPPER AIR SUMMARY

           DATE: 810325      HOUR:  630

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

      0.0             53.5        4      4.299
    117.7             32.1        4      5.607
    363.8            214.0        2      0.654


MORNING MIXING HEIGHT:          73.0  M
 AVERAGE WIND SPEED THRU MIXED LAYER:          1.5  M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
    SFC        0.0         0.
    100.       3.2        35.
    200.       2.3        54.
    300.       1.7        99.
    500.       5.6       105.
    750.      11.0       120.
   1000.       5.8       112.
   1500.       6.9       163.
   2000.       6.7       203.
```

```
           NINE PIPES UPPER AIR SUMMARY

           DATE: 810325      HOUR:  715

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

      0.0            267.5        2        1.121
    438.7            331.7        1        0.362


MORNING MIXING HEIGHT:         146.3  M
 AVERAGE WIND SPEED THRU MIXED LAYER:          2.3  M/S


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
    SFC        2.2        50.
    100.       2.2        36.
    200.       2.9        57.
    300.       2.0        14.
    500.       2.9       129.
    750.       7.8       164.
   1000.      10.3       162.
```

TABLE 4B

```
           KALISPELL UPPER AIR SUMMARY

            DATE: 810403      HOUR:  615

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

      85.6             64.2        1       0.156


MORNING MIXING HEIGHT:       1135.9  M

 AVERAGE LAPSE RATE BELOW FIRST INVERSION IS: -1.869

 AVERAGE WIND SPEED THRU MIXED LAYER:           7.4  M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD  WIND DIR
    (M)       (M/SEC)    (DEG)
    SFC          2.7     167.
   100.          9.5     117.
   200.          6.9      95.
   300.          7.4     139.
   500.          8.4     146.
   750.          5.6     210.
  1000.          6.4     209.
```

```
            NINE PIPES UPPER AIR SUMMARY

             DATE: 810403      HOUR:  655

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M

      0.0              0.0        0         0.0


MORNING MIXING HEIGHT:        485.8  M
 AVERAGE WIND SPEED THRU MIXED LAYER:             6.0  M/

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD  WIND DIR
    (M)       (M/SEC)    (DEG)
    SFC          3.6     180.
   100.          4.6     171.
   200.          7.6     169.
   300.          8.5     161.
   500.          8.6     157.
   750.         11.3     145.
  1000.         10.3     153.
```

```
           KALISPELL UPPER AIR SUMMARY

            DATE: 810417      HOUR:  555

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

      0.0             310.3        3       2.191
   1765.7              74.9        1       0.133


MORNING MIXING HEIGHT:         56.6  M
 AVERAGE WIND SPEED THRU MIXED LAYER:           1.6  M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD  WIND DIR
    (M)       (M/SEC)    (DEG)
    SFC          0.0       0.
   100.          1.5     349.
   200.          3.8     174.
   300.          6.5     143.
   500.          5.2     122.
   750.          5.1     179.
  1000.          4.0     189.
  1500.          8.5     168.
  2000.          5.8     205.
```

```
            NINE PIPES UPPER AIR SUMMARY

             DATE: 810417      HOUR:  625

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

      0.0              32.1        4        3.115
    160.5             160.5        2        1.121


MORNING MIXING HEIGHT:        172.7  M
 AVERAGE WIND SPEED THRU MIXED LAYER:             3.9  M/S

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD  WIND DIR
    (M)       (M/SEC)    (DEG)
    SFC          2.2     160.
   100.          2.7     164.
   200.          5.7     167.
   300.          4.6     172.
   500.          4.5     168.
   750.          1.7     206.
  1000.          1.6     200.
  1500.          2.1     265.
```

```
           KALISPELL UPPER AIR SUMMARY

            DATE: 810422      HOUR:  535

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

      0.0              21.4        3       2.336


MORNING MIXING HEIGHT:       1069.9  M
 AVERAGE WIND SPEED THRU MIXED LAYER:           7.1  M/SEC

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD  WIND DIR
    (M)       (M/SEC)    (DEG)
    SFC          4.0     189.
   100.          7.2     118.
   200.         13.8     124.
   300.          4.6     166.
   500.          6.4     158.
   750.          7.2     209.
  1000.          8.6     228.
  1500.         11.5     256.
```

```
            NINE PIPES UPPER AIR SUMMARY

             DATE: 810422      HOUR:  620

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

      0.0             128.4        2        0.779


MORNING MIXING HEIGHT:        221.8  M
 AVERAGE WIND SPEED THRU MIXED LAYER:             5.2  M/SE

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD  WIND DIR
    (M)       (M/SEC)    (DEG)
    SFC          2.2     160.
   100.          4.2     156.
   200.          6.9     161.
   300.          4.7     174.
   500.          2.9     192.
   750.          5.6     238.
  1000.          6.7     246.
```

TABLE 4C

```
        KALISPELL UPPER AIR SUMMARY

          DATE: 810504      HOUR:  514

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

      0.0              171.2        2          0.642
    246.1              117.7        3          2.379


MORNING MIXING HEIGHT:        192.5  M
 AVERAGE WIND SPEED THRU MIXED LAYER:           4.7   M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
    SFC        2.2        45.
   100.        4.4        12.
   200.        6.0       359.
   300.        8.7         9.
   500.        5.4         5.
   750.        3.9        90.
  1000.        6.1       111.
  1500.        5.3       103.
  2000.        8.7       134.
```

```
        KALISPELL UPPER AIR SUMMARY

          DATE: 810513      HCUR:  505

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

     53.5              235.4        2          0.977
    417.3              171.2        1          0.117


MORNING MIXING HEIGHT:        197.3  M

 AVERAGE LAPSE RATE BELOW FIRST INVERSION IS: -0.748

 AVERAGE WIND SPEED THRU MIXED LAYER:          5.3   M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
    SFC        1.8         7.
   100.        4.7       357.
   200.        6.6         3.
   300.        1.8        55.
   500.        4.9       122.
   750.        3.6       119.
   000.        5.7       143.
   500.        4.6       155.
  2000.        4.5       152.
```

```
        KALISPELL UPPER AIR SUMMARY

          DATE: 810520      HOUR:  450

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

     42.8               85.6        3          1.402
    288.9              107.0        2          0.934


MORNING MIXING HEIGHT:        294.7  M

 AVERAGE LAPSE RATE BELOW FIRST INVERSION IS: -2.336

 AVERAGE WIND SPEED THRU MIXED LAYER:          4.7   M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
    SFC        1.3       313.
   100.        3.8       323.
   200.        5.1       344.
   300.        5.7        19.
   500.        2.8         4.
   750.        0.8        71.
  1000.        3.9        87.
  1500.        3.5       125.
  2000.        2.3        79.
```

```
        NINE PIPES UPPER AIR SUMMARY

          DATE: 810504      HOUR:  555

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M

      0.0              128.4        3          2.570
    192.6              278.2        2          0.719
    642.1              342.4        1          0.234


MORNING MIXING HEIGHT:         38.6  M
 AVERAGE WIND SPEED THRU MIXED LAYER:            1.3   M/


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
    SFC        0.9       250.
   100.        2.0       258.
   200.        1.3       249.
   300.        1.6       112.
   500.        1.5        49.
   750.        0.2        29.
  1000.        2.0       121.
```

```
        NINE PIPES UPPER AIR SUMMARY

          DATE: 810513      HCUR:  533

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

      0.0              224.7        2          1.112
    395.9              171.2        1          0.234


MORNING MIXING HEIGHT:         89.5  M
 AVERAGE WIND SPEED THRU MIXED LAYER:            1.3   M/S


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
    SFC        0.9       270.
   100.        1.2       204.
   200.        0.7       245.
   300.        2.4       190.
   500.        5.0       155.
   750.        4.2       178.
  1000.        3.3       167.
  1500.        1.1       104.
  2000.        1.9        76.
```

```
        NINE PIPES UPPER AIR SUMMARY

          DATE: 810520      HOUR:  526

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

      0.0               53.5        4          3.738


MORNING MIXING HEIGHT:        140.8  M
 AVERAGE WIND SPEED THRU MIXED LAYER:            1.8   M/SE


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
    SFC        0.9       160.
   100.        1.7       167.
   200.        2.0       214.
   300.        1.9       227.
   500.        2.7       196.
   750.        4.2       142.
  1000.        3.3       145.
  1500.        1.5       130.
  2000.        1.8       136.
```

TABLE 4D

```
            KALISPELL UPPER AIR SUMMARY

             DATE: 810525      HOUR: 450

      HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

       0.0             214.0       2         0.794
     385.2             171.2       1         0.407
    1016.6             160.5       1         0.125


MORNING MIXING HEIGHT:          180.3  M
 AVERAGE WIND SPEED THRU MIXED LAYER:           4.8  M/SEC

  WIND SPEED AND DIRECTION SUMMARY
    HEIGHT    WIND SPD   WIND DIR
     (M)      (M/SEC)     (DEG)
     SFC         1.3      340.
     100.        5.0       14.
     200.        7.0       10.
     300.        3.4        2.
     500.        3.6      151.
     750.        2.5      143.
    1000.        3.0      133.
    1500.        5.9      119.
    2000.        7.3      185.
```

```
            KALISPELL UPPER AIR SUMMARY

             DATE: 810608      HOUR: 440

      HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

       0.0             0.0         0         0.0


MORNING MIXING HEIGHT:         1452.6  M
 AVERAGE WIND SPEED THRU MIXED LAYER:           5.4  M/SEC

  WIND SPEED AND DIRECTION SUMMARY
    HEIGHT    WIND SPD   WIND DIR
     (M)      (M/SEC)     (DEG)
     SFC         1.8      313.
     100.        3.8      223.
     200.        3.5      204.
     300.        6.2      180.
     500.        4.7      189.
     750.        2.4      254.
    1000.        6.9      240.
    1500.        7.3      262.
```

```
            KALISPELL UPPER AIR SUMMARY

             DATE: 810610      HOUR: 455

      HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

       0.0             214.0       3         1.542
     385.2              53.5       3         1.308


MORNING MIXING HEIGHT:          132.3  M
 AVERAGE WIND SPEED THRU MIXED LAYER:           0.6  M/SEC

  WIND SPEED AND DIRECTION SUMMARY
    HEIGHT    WIND SPD   WIND DIR
     (M)      (M/SEC)     (DEG)
     SFC         0.9      259.
     100.        0.6      145.
     200.        3.0      182.
     300.        4.9      163.
     500.        7.4      132.
     750.        5.0      119.
    1000.        5.2      161.
    1500.       10.2      206.
```

```
            NINE PIPES UPPER AIR SUMMARY

             DATE: 810525      HOUR: 522

      HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/10

       0.0             481.6       2         0.540


MORNING MIXING HEIGHT:          116.7  M
 AVERAGE WIND SPEED THRU MIXED LAYER:           0.9

  WIND SPEED AND DIRECTION SUMMARY
    HEIGHT    WIND SPD   WIND DIR
     (M)      (M/SEC)     (DEG)
     SFC         0.9       50.
     100.        0.8      244.
     200.        2.1      245.
     300.        2.6      289.
     500.        0.8      259.
     750.        0.3        6.
    1000.        1.6        3.
    1500.        7.4      124.
```

```
            NINE PIPES UPPER AIR SUMMARY

             DATE: 810608      HOUR: 511

      HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100

       0.0             0.0         0         0.0


MORNING MIXING HEIGHT:          799.0  M
 AVERAGE WIND SPEED THRU MIXED LAYER:           3.2  M/

  WIND SPEED AND DIRECTION SUMMARY
    HEIGHT    WIND SPD   WIND DIR
     (M)      (M/SEC)     (DEG)
     SFC         0.9      300.
     100.        2.5      296.
     200.        2.9      291.
     300.        3.3      295.
     500.        3.0      310.
     750.        3.2      [illegible]39.
    1000.        4.0      [illegible]15.
```

```
            NINE PIPES UPPER AIR SUMMARY

             DATE: 810610      HOUR: 517

  WIND SPEED AND DIRECTION SUMMARY
    HEIGHT    WIND SPD   WIND DIR
     (M)      (M/SEC)     (DEG)
     SFC         2.2      165.
     100.        2.3      179.
     200.        6.0      177.
     300.        4.3      177.
     500.        4.2      180.
     750.        1.8      255.
    1000.        6.1      239.
    1500.        4.0      242.
    2000.        5.9      227.
```

TABLE 4E

```
        KALISPELL UPPER AIR SUMMARY

         DATE: 810612      HOUR:  440

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

      0.0              0.0         0        0.0


MORNING MIXING HEIGHT:        1130.0  M
 AVERAGE WIND SPEED THRU MIXED LAYER:          4.9   M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
     SFC        2.7        7.
    100.        5.4      331.
    200.        8.0      353.
    300.        7.7        8.
    500.        2.8       22.
    750.        6.2      110.
   1000.        4.0      123.
   1500.        4.5      109.
   2000.        4.9       99.
```

```
        KALISPELL UPPER AIR SUMMARY

         DATE: 810715      HOUR:  450

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

      0.0             299.6        2       0.768
   1626.0             171.2        1       0.292


MORNING MIXING HEIGHT:        142.7  M
 AVERAGE WIND SPEED THRU MIXED LAYER:          1.6   M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
     SFC        0.0        0.
    100.        1.6      287.
    200.        1.7      272.
    300.         .8      224.
    500.        1.2      156.
    750.        2.4      165.
   1000.        1.3      215.
   1500.        3.1      183.
   2000.        6.6      266.
```

```
        KALISPELL UPPER AIR SUMMARY

         DATE: 810720      HOUR:  455

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

      32.1            428.0        3        1.191


MORNING MIXING HEIGHT:        132.6  M

 AVERAGE LAPSE RATE BELOW FIRST INVERSION IS: -3.115

 AVERAGE WIND SPEED THRU MIXED LAYER:          2.1   M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
     SFC        0.0        0.
    100.        2.3      140.
    200.        5.4      130.
    300.        6.3      110.
    500.        6.5      121.
    750.        5.1      149.
   1000.        6.9      187.
   1500.        7.8      223.
   2000.       12.9      251.
```

```
        NINE PIPES UPPER AIR SUMMARY

         DATE: 810612      HOUR:  510

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/1

      0.0             53.5         2         0.748


MORNING MIXING HEIGHT:        400.0  M
 AVERAGE WIND SPEED THRU MIXED LAYER:              4.8


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
     SFC        2.2       30.
    100.        7.1       12.
    200.        2.5      352.
    300.        6.1       11.
    500.        5.2       30.
    750.        3.2      204.
   1000.        4.5      188.
```

```
        NINE PIPES UPPER AIR SUMMARY

         DATE: 810715      HOUR:  550

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/1

      0.0             492.3        2         0.569


MORNING MIXING HEIGHT:        165.0  M
 AVERAGE WIND SPEED THRU MIXED LAYER:              2.8


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
     SFC        0.9      180.
    100.        3.0      228.
    200.        1.9      239.
    300.        2.9      181.
    500.        2.7      171.
    750.        1.9      157.
   1000.        1.4      143.
   1500.        2.2      255.
   2000.        3.3      211.
```

```
        NINE PIPES UPPER AIR SUMMARY

         DATE: 810720      HOUR:  531

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/1

      0.0             331.7        2         0.844
    674.2             171.2        3         2.336


MORNING MIXING HEIGHT:        142.2  M
 AVERAGE WIND SPEED THRU MIXED LAYER:              3.9


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
     SFC        1.8      180.
    100.        3.4      182.
    200.        5.7      179.
    300.        5.8      178.
    500.        4.6      206.
    750.        4.1      216.
   1000.        5.4      231.
   1500.        5.6      259.
   2000.        6.6      253.
```

TABLE 4F

```
          KALISPELL UPPER AIR SUMMARY

           DATE: 810803      HOUR:  515

       HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
 INV. BASE(M AGL)   THICKNESS (M)  TYPE   DT/DZ (C/100M)

      0.0              171.2         4         3.387
    278.2              321.0         2         0.748


 MORNING MIXING HEIGHT:          18.3  M
  AVERAGE WIND SPEED THRU MIXED LAYER:            4.0   M/SEC

  WIND SPEED AND DIRECTION SUMMARY
    HEIGHT     WIND SPD   WIND DIR
     (M)        (M/SEC)    (DEG)
     SFC          1.3        7.
     100.         4.6      343.
     200.         3.8      322.
     300.         5.3        0.
     500.         1.7       25.
     750.         1.6       68.
    1000.         1.2      229.
    1500.         5.2      329.
    2000.         3.9      307.
 ----------------------------------------------------------------
```

```
          NINE PIPES UPPER AIR SUMMARY

           DATE: 810803      HOUR:  555

       HOLZWORTH CLASSIFICATION SCHEME FOR INVERSION
 INV. BASE(M AGL)   THICKNESS (M)  TYPE   DT/DZ (C/1

      0.0              845.4         2         0.840


 MORNING MIXING HEIGHT:          48.7  M
  AVERAGE WIND SPEED THRU MIXED LAYER:            1.6

  WIND SPEED AND DIRECTION SUMMARY
    HEIGHT     WIND SPD   WIND DIR
     (M)        (M/SEC)    (DEG)
     SFC          1.3      360.
     100.         2.7      227.
     200.         2.7      256.
     300.         2.8      247.
     500.         1.2      227.
     750.         1.3      148.
    1000.         1.2       70.
    1500.         2.3       36.
 ----------------------------------------------------------------
```

```
          KALISPELL UPPER AIR SUMMARY

           DATE: 810805      HOUR:  515

       HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
 INV. BASE(M AGL)   THICKNESS (M)  TYPE   DT/DZ (C/100M)

      0.0               96.3         4         5.607
    160.5               74.9         3         1.335
    353.1              321.0         1         0.343


 MORNING MIXING HEIGHT:          30.4  M
  AVERAGE WIND SPEED THRU MIXED LAYER:            1.6   M/SEC

  WIND SPEED AND DIRECTION SUMMARY
    HEIGHT     WIND SPD   WIND DIR
     (M)        (M/SEC)    (DEG)
     SFC          0.9      335.
     100.         3.6      348.
     200.         3.8      346.
     300.         5.1      355.
     500.         6.7      349.
     750.         4.5      308.
    1000.         3.4      334.
    1500.         1.3      255.
    2000.         2.8      227.
 ----------------------------------------------------------------
```

```
          NINE PIPES UPPER AIR SUMMARY

           DATE: 810805      HOUR:  551

       HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
 INV. BASE(M AGL)   THICKNESS (M)  TYPE   DT/DZ (C/10

      0.0              374.5         3         1.308


 MORNING MIXING HEIGHT:          52.3  M
  AVERAGE WIND SPEED THRU MIXED LAYER:            0.8
    .
  WIND SPEED AND DIRECTION SUMMARY
    HEIGHT     WIND SPD   WIND DIR
     (M)        (M/SEC)    (DEG)
     SFC          1.3       45.
     100.         0.2      356.
     200.         2.1      295.
     300.         2.2      235.
     500.         1.6      191.
     750.         2.6      107.
    1000.         4.0       29.
    1500.         2.8       22.
    2000.         0.7       13.
 ----------------------------------------------------------------
```

```
          KALISPELL UPPER AIR SUMMARY

           DATE: 810807      HOUR:  520

       HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
 INV. BASE(M AGL)   THICKNESS (M)  TYPE   DT/DZ (C/100M)

      0.0              406.6         3         2.508
    470.9              107.0         2         1.028


 MORNING MIXING HEIGHT:          27.7  M
  AVERAGE WIND SPEED THRU MIXED LAYER:            1.4   M/SEC

  WIND SPEED AND DIRECTION SUMMARY
    HEIGHT     WIND SPD   WIND DIR
     (M)        (M/SEC)    (DEG)
     SFC          0.0        0.
     100.         3.1      337.
     200.         7.1      351.
     300.         7.3        2.
     500.         5.5       24.
     750.         0.7       55.
    1000.         1.1       52.
    1500.         4.3       75.
    2000.         5.0      103.
```

```
          NINE PIPES UPPER AIR SUMMARY

           DATE: 810807      HOUR:  614

       HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
 INV. BASE(M AGL)   THICKNESS (M)  TYPE   DT/DZ (C/10C

      0.0              503.0         3         1.312
    738.4               64.2         2         0.934


 MORNING MIXING HEIGHT:          83.7  M
  AVERAGE WIND SPEED THRU MIXED LAYER:            1.1   M

  WIND SPEED AND DIRECTION SUMMARY
    HEIGHT     WIND SPD   WIND DIR
     (M)        (M/SEC)    (DEG)
     SFC          0.4      270.
     100.         2.0      344.
     200.         4.0        2.
     300.         1.9       22.
     500.         1.6      329.
     750.         2.0      155.
    1000.         1.0      354.
    1500.         2.5       99.
    2000.         3.7      135.
```

TABLE 4G

```
          KALISPELL UPPER AIR SUMMARY

           DATE: 810810       HOUR:  525

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
 INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

       32.1             759.8        2         1.000
     1444.7              64.2        1         0.156


 MORNING MIXING HEIGHT:          88.0  M

  AVERAGE LAPSE RATE BELOW FIRST INVERSION IS: -1.869

  AVERAGE WIND SPEED THRU MIXED LAYER:          4.1  M/SEC


  WIND SPEED AND DIRECTION SUMMARY
    HEIGHT    WIND SPD  WIND DIR
     (M)      (M/SEC)    (DEG)
     SFC        2.2       351.
     100.       6.0       340.
     200.      11.9         1.
     300.      10.4         4.
     500.       1.4        26.
     750.       5.4        12.
    1000.       5.6        45.
    1500.       5.5        57.
    2000.       7.0        93.
```

```
          KALISPELL UPPER AIR SUMMARY

           DATE: 810814       HOUR:  530

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
 INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

        0.0             224.7        4         3.115
      353.1              74.9        3         1.201
      545.8              32.1        3         1.557
      963.1              53.5        1         0.187


 MORNING MIXING HEIGHT:          31.9  M
  AVERAGE WIND SPEED THRU MIXED LAYER:          1.5  M/SEC


  WIND SPEED AND DIRECTION SUMMARY
    HEIGHT    WIND SPD  WIND DIR
     (M)      (M/SEC)    (DEG)
     SFC        0.9        80.
     100.       7.2        16.
     200.       7.9        16.
     300.       2.0       105.
     500.       1.6       201.
     750.       7.0       130.
    1000.       5.4       135.
    1500.       3.8       156.
    2000.       6.3       168.
```

```
          KALISPELL UPPER AIR SUMMARY

           DATE: 810817       HOUR:  535

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
 INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

        0.0             417.3        2         1.006
      588.6              53.5        2         1.121
      781.2             171.2        1         0.292
     1305.5              64.2        1         0.156


 MORNING MIXING HEIGHT:          91.3  M
  AVERAGE WIND SPEED THRU MIXED LAYER:          3.0  M/SEC


  WIND SPEED AND DIRECTION SUMMARY
    HEIGHT    WIND SPD  WIND DIR
     (M)      (M/SEC)    (DEG)
     SFC        0.9       351.
     100.       3.3       217.
     200.       1.7       286.
     300.       2.7       348.
     500.       3.0       326.
     750.       3.6       187.
    1000.      10.7       197.
    1500.      11.2       167.
    2000.       9.6       143.
```

```
          NINE PIPES UPPER AIR SUMMARY

           DATE: 810810       HOUR:  553

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIC
 INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/

        0.0             267.5        4         3.140
      492.3             203.3        2         0.550


 MORNING MIXING HEIGHT:          22.3  M
  AVERAGE WIND SPEED THRU MIXED LAYER:             0.7


  WIND SPEED AND DIRECTION SUMMARY
    HEIGHT    WIND SPD  WIND DIR
     (M)      (M/SEC)    (DEG)
     SFC        0.9        75.
     100.       0.7       142.
     200.       0.7       200.
     300.       2.2       237.
     500.       1.4       297.
     750.       2.4        51.
    1000.       2.2       130.
    1500.       2.8       181.
    2000.       1.0       110.
```

```
          NINE PIPES UPPER AIR SUMMARY

           DATE: 810814       HOUR:  557

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSION
 INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/1

        0.0             235.4        4         2.846
      684.9              96.3        1         0.208


 MORNING MIXING HEIGHT:          28.5  M
  AVERAGE WIND SPEED THRU MIXED LAYER:             3.5


  WIND SPEED AND DIRECTION SUMMARY
    HEIGHT    WIND SPD  WIND DIR
     (M)      (M/SEC)    (DEG)
     SFC        0.7       113.
     100.       3.6       137.
     200.       2.5       195.
     300.       3.4       197.
     500.       4.6       196.
     750.       6.4       170.
    1000.       3.8       208.
    1500.       6.7       260.
    2000.       4.0       263.
```

```
          NINE PIPES UPPER AIR SUMMARY

           DATE: 810817       HOUR:  615

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSION
 INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/1

        0.0             599.3        3         1.585


 MORNING MIXING HEIGHT:          61.0  M
  AVERAGE WIND SPEED THRU MIXED LAYER:             2.6


  WIND SPEED AND DIRECTION SUMMARY
    HEIGHT    WIND SPD  WIND DIR
     (M)      (M/SEC)    (DEG)
     SFC        1.8       360.
     100.       3.4       284.
     200.       2.3       292.
     300.       3.0       249.
     500.       3.1       189.
     750.       3.1       217.
    1000.       1.7       172.
    1500.       5.2       165.
    2000.       3.1       179.
```

TABLE 4H

```
         KALISPELL UPPER AIR SUMMARY

          DATE: 810824      HOUR:  545

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
 INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

      0.0             406.6        3         1.820
   1562.4             171.2        1         0.350


MORNING MIXING HEIGHT:          51.3  M
 AVERAGE WIND SPEED THRU MIXED LAYER:          4.1   M/SEC

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD  WIND DIR
    (M)       (M/SEC)    (DEG)
    SFC         2.2       34.
   100.         6.4      360.
   200.        11.5        9.
   300.         3.4       41.
   500.         1.2      182.
   750.         2.2       54.
  1000.         3.2       85.
  1500.         6.7      105.
  2000.         6.7      130.
```

```
         KALISPELL UPPER AIR SUMMARY

          DATE: 810902      HOUR:  555

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
 INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

      0.0             203.3        4         2.853


MORNING MIXING HEIGHT:          45.4  M
 AVERAGE WIND SPEED THRU MIXED LAYER:          0.9   M/SEC

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD  WIND DIR
    (M)       (M/SEC)    (DEG)
    SFC         0.9      205.
   100.         0.8      264.
   200.         1.7      180.
   300.         3.3      194.
   500.         4.4      205.
   750.         4.1      233.
  1000.         5.5      232.
  1500.         6.7      235.
  2000.         9.3      240.
```

```
         KALISPELL UPPER AIR SUMMARY

          DATE: 810904      HOUR:  600

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
 INV. BASE(M AGL)  THICKNESS (M)  TYPE _DT/DZ (C/100M)

      0.0             139.1        4         3.450
    267.5             267.5        3         1.346


MORNING MIXING HEIGHT:          47.7  M
 AVERAGE WIND SPEED THRU MIXED LAYER:          0.7   M/SEC

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD  WIND DIR
    (M)       (M/SEC)    (DEG)
    SFC         0.9      302.
   100.         3.8      358.
   200.         2.9      349.
   300.         2.2       15.
   500.         2.8       42.
   750.         4.4      168.
  1000.         6.1      209.
  1500.         4.5      204.
  2000.         5.2      222.
```

```
         NINE PIPES UPPER AIR SUMMARY

          DATE: 810824      HOUR:  620

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
 INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100

      0.0             256.8        4         3.582
    385.2             117.7        3         1.359


MORNING MIXING HEIGHT:          19.6  M
 AVERAGE WIND SPEED THRU MIXED LAYER:          1.2   M

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD  WIND DIR
    (M)       (M/SEC)    (DEG)
    SFC         1.6       45.
   100.         2.4       26.
   200.         1.9      241.
   300.         2.8      313.
   500.         4.5      341.
   750.         2.3      246.
  1000.         4.4      149.
  1500.         3.8      119.
  2000.        10.5      143.
```

```
         NINE PIPES UPPER AIR SUMMARY

          DATE: 810902      HOUR:  707

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
 INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100

      0.0              53.5        3         1.682


MORNING MIXING HEIGHT:        1135.6  M
 AVERAGE WIND SPEED THRU MIXED LAYER:          4.3   M/

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD  WIND DIR
    (M)       (M/SEC)    (DEG)
    SFC         1.3      230.
   100.         4.4      227.
   200.         3.5      223.
   300.         3.6      219.
   500.         2.9      257.
   750.         5.0      252.
  1000.         6.8      258.
```

```
         NINE PIPES UPPER AIR SUMMARY

          DATE: 810904      HOUR:  645

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
 INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M

      0.0             181.9        3         2.144
    395.9             256.8        2         0.506
    995.2             171.2        1         0.058


MORNING MIXING HEIGHT:          78.7  M
 AVERAGE WIND SPEED THRU MIXED LAYER:          0.9   M/

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD  WIND DIR
    (M)       (M/SEC)    (DEG)
    SFC         0.9       90.
   100.         0.7      112.
   200.         2.0      271.
   300.         1.6      243.
   500.         2.9      245.
   750.         2.3      247.
  1000.         5.8      200.
  1500.         6.0      251.
  2000.         5.6      249.
```

TABLE 4I

```
           KALISPELL UPPER AIR SUMMARY

            DATE: 810907     HOUR:  605

        HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
 INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

        0.0              160.5       4        3.177
      224.7              246.1       2        1.097
      586.6               53.5       4        3.364


 MORNING MIXING HEIGHT:            51.7  M
  AVERAGE WIND SPEED THRU MIXED LAYER:              2.7   M/SEC

  WIND SPEED AND DIRECTION SUMMARY
    HEIGHT    WIND SPD   WIND DIR
     (M)      (M/SEC)     (DEG)
     SFC         2.7       351.
     100.        6.4       347.
     200.        7.4       331.
     300.        8.8       354.
     500.        3.7       264.
     750.        2.3        85.
    1000.        3.2        71.
    1500.        6.2        87.
    2000.        9.4       132.
```

```
           KALISPELL UPPER AIR SUMMARY

            DATE: 810911     HOUR:  610

        HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
 INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

        0.0              214.0       4        3.364
      374.5              160.5       2        0.934
      761.2               74.9       2        0.534
     1712.2              171.2       1        0.350


 MORNING MIXING HEIGHT:            25.9  M
  AVERAGE WIND SPEED THRU MIXED LAYER:              1.7   M/SEC

  WIND SPEED AND DIRECTION SUMMARY
    HEIGHT    WIND SPD   WIND DIR
     (M)      (M/SEC)     (DEG)
     SFC         0.0         0.
     100.        3.8        13.
     200.        5.0        10.
     300.        7.4       357.
     500.        4.3        28.
     750.        4.5       145.
    1000.        4.0       151.
    1500.        3.7       193.
    2000.        8.6       210.
```

```
           KALISPELL UPPER AIR SUMMARY

            DATE: 810923     HOUR:  625

        HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
 INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

      53.5             203.3        3        1.672


 MORNING MIXING HEIGHT:         225.3  M

  AVERAGE LAPSE RATE BELOW FIRST INVERSION IS: -3.925

  AVERAGE WIND SPEED THRU MIXED LAYER:             3.1   M/SEC

  WIND SPEED AND DIRECTION SUMMARY
    HEIGHT    WIND SPD   WIND DIR
     (M)      (M/SEC)     (DEG)
     SFC         0.0         0.
     100.        2.4       212.
     200.        5.3       137.
     300.        6.8       134.
     500.        5.8       131.
     750.        6.9       158.
    1000.        4.2       186.
    1500.        8.2       243.
    2000.        8.7       235.
```

```
           NINE PIPES UPPER AIR SUMMARY

            DATE: 810907     HOUR:  636

        HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
 INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100

        0.0              321.0       3        2.305
      492.3              663.5       1        0.256


 MORNING MIXING HEIGHT:            38.6  M
  AVERAGE WIND SPEED THRU MIXED LAYER:              1.4   M/

  WIND SPEED AND DIRECTION SUMMARY
    HEIGHT    WIND SPD   WIND DIR
     (M)      (M/SEC)     (DEG)
     SFC         0.9       120.
     100.        0.8       146.
     200.        1.6        79.
     300.        1.0        56.
     500.        1.4       161.
     750.        2.4       108.
    1000.        3.0       157.
    1500.        3.4       103.
    2000.       10.2       147.
```

```
           NINE PIPES UPPER AIR SUMMARY

            DATE: 810911     HOUR:  636

        HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
 INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M

        0.0              610.0       2        1.131
     1765.7              107.0       2        0.934


 MORNING MIXING HEIGHT:            29.0  M
  AVERAGE WIND SPEED THRU MIXED LAYER:              0.9   M/

  WIND SPEED AND DIRECTION SUMMARY
    HEIGHT    WIND SPD   WIND DIR
     (M)      (M/SEC)     (DEG)
     SFC         0.9       180.
     100.        1.4       225.
     200.        3.3       225.
     300.        0.7       171.
     500.        2.1       192.
     750.        2.1       152.
    1000.        1.9       154.
    1500.        5.3       176.
    2000.        2.0       190.
```

```
           NINE PIPES UPPER AIR SUMMARY

            DATE: 810923     HOUR:  705

        HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
 INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

      0.0              385.2        2        0.779


 MORNING MIXING HEIGHT:        136.2  M
  AVERAGE WIND SPEED THRU MIXED LAYER:              2.7   M/

  WIND SPEED AND DIRECTION SUMMARY
    HEIGHT    WIND SPD   WIND DIR
     (M)      (M/SEC)     (DEG)
     SFC         0.9       180.
     100.        3.3       222.
     200.        3.3       178.
     300.        4.0       166.
     500.        5.3       174.
     750.        3.2       199.
    1000.        2.3       214.
    1500.        4.2       212.
    2000.        3.9       244.
```

TABLE 4J

```
           KALISPELL UPPER AIR SUMMARY

           DATE: 810925       HOUR:  635

    HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)   THICKNESS (M)   TYPE   DT/DZ (C/100M)

     10.7             128.4          3         1.324
    214.0              53.5          2         0.934


MORNING MIXING HEIGHT:          222.3  M

 AVERAGE LAPSE RATE BELOW FIRST INVERSION IS: -5.607

 AVERAGE WIND SPEED THRU MIXED LAYER:           2.6  M/SEC

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
    SFC        0.0         0.
    100.       3.4       315.
    200.       4.6       290.
    300.       6.2       294.
    500.       7.4       276.
    750.       5.8       294.
   1000.       4.2       279.
   1500.       4.3       302.
   2000.       6.4       296.
```

```
           NINE PIPES UPPER AIR SUMMARY

           DATE: 810925       HOUR:  708

    HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)   THICKNESS (M)   TYPE   DT/DZ (C/100

     0.0               0.0          0         0.0


MORNING MIXING HEIGHT:          548.1  M
 AVERAGE WIND SPEED THRU MIXED LAYER:             3.0  M/

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
    SFC        1.3       110.
    100.       3.6       139.
    200.       2.6       206.
    300.       3.7       215.
    500.       2.7       198.
    750.       2.0       186.
   1000.       3.2       281.
   1500.       2.6       324.
   2000.       8.9       341.
```

```
           KALISPELL UPPER AIR SUMMARY

           DATE: 810930       HOUR:  640

    HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)   THICKNESS (M)   TYPE   DT/DZ (C/100M)

    107.0             224.7          2         0.979


MORNING MIXING HEIGHT:          279.2  M

 AVERAGE LAPSE RATE BELOW FIRST INVERSION IS: -1.775

 AVERAGE WIND SPEED THRU MIXED LAYER:           4.3  M/SEC

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
    SFC        0.0         0.
    100.       2.8       154.
    200.       5.5       174.
    300.       6.1       132.
    500.       6.6       140.
    750.       7.8       180.
   1000.       5.4       207.
   1500.       4.6       272.
```

```
           NINE PIPES UPPER AIR SUMMARY

           DATE: 810930       HOUR:  718

    HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)   THICKNESS (M)   TYPE   DT/DZ (C/100

     0.0             267.5          3         1.271


MORNING MIXING HEIGHT:          141.1  M
 AVERAGE WIND SPEED THRU MIXED LAYER:             2.7

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
    SFC        1.3       180.
    100.       2.9       200.
    200.       3.3       168.
    300.       4.0       201.
    500.       4.2       214.
    750.       3.3       211.
   1000.       3.2       231.
   1500.       1.7       203.
   2000.       2.5       300.
```

```
           KALISPELL UPPER AIR SUMMARY

           DATE: 811005       HOUR:  645

    HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)   THICKNESS (M)   TYPE   DT/DZ (C/100M)

     10.7             256.8          3         2.297
    438.7             149.8          2         0.601


MORNING MIXING HEIGHT:           64.2  M

 AVERAGE LAPSE RATE BELOW FIRST INVERSION IS: -4.672

 AVERAGE WIND SPEED THRU MIXED LAYER:           1.6  M/SEC

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
    SFC        0.0         0.
    100.       3.1       313.
    200.       2.8        21.
    300.       1.4        52.
    500.       3.4        13.
    750.       3.1        43.
   1000.       3.4        54.
   1500.       4.5        85.
```

```
           NINE PIPES UPPER AIR SUMMARY

           DATE: 811005       HOUR:  708

    HOLZWORTH CLASSIFICATION SCHEME FOR INVERSI
INV. BASE(M AGL)   THICKNESS (M)   TYPE   DT/DZ (C,

     0.0             428.0          3         1.378
    535.1            107.0          2         0.654


MORNING MIXING HEIGHT:           29.9  M
 AVERAGE WIND SPEED THRU MIXED LAYER:             1.

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
    SFC        0.6        70.
    100.       1.4       181.
    200.       2.0       212.
    300.       3.0       184.
    500.       2.8       149.
    750.       8.6       141.
   1000.       6.1       167.
   1500.       5.3       190.
   2000.       7.2       235.
```

TABLE 4K

```
          KALISPELL UPPER AIR SUMMARY

            DATE: 811007      HOUR:  645

       HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)   THICKNESS (M)   TYPE   DT/DZ (C/100M)

      10.7             417.3          3         2.252


MORNING MIXING HEIGHT:          40.0   M

 AVERAGE LAPSE RATE BELOW FIRST INVERSION IS: -1.869

 AVERAGE WIND SPEED THRU MIXED LAYER:           1.0   M/SEC

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT      WIND SPD   WIND DIR
    (M)        (M/SEC)     (DEG)
     SFC          0.9        29.
    100.          1.8       315.
    200.          1.4       319.
    300.          3.8       288.
    500.          3.1       271.
    750.          4.4       294.
   1000.          3.3       284.
   1500.          1.2       164.
   2000.          6.1       211.
```

```
          KALISPELL UPPER AIR SUMMARY

            DATE: 811014      HOUR:  655

       HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)   THICKNESS (M)   TYPE   DT/DZ (C/100M)
       0.0
     342.4             214.0          2         1.075
    1155.7              53.5          2         0.748 .
                       288.9          1         0.277


MORNING MIXING HEIGHT:          135.4   M
 AVERAGE WIND SPEED THRU MIXED LAYER:
                                                1.2   M/SEC
WIND SPEED AND DIRECTION SUMMARY
  HEIGHT      WIND SPD   WIND DIR
   (M)        (M/SEC)     (DEG)
    SFC         0.0
   100.         0.8          0.
   200.         4.2         42.
   300.         7.2         25.
   500.         2.3         10.
   750.         1.2         41.
  1000.         0.2        190.
  1500.         8.5         45.
  2000.        10.7        293.
                           357.
```

```
          KALISPELL UPPER AIR SUMMARY.

            DATE: 811019      HOUR:  710

       HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)   THICKNESS (M)   TYPE   DT/DZ (C/100M)

     21.4              342.4          4         2.942


MORNING MIXING HEIGHT:          72.0   M

 AVERAGE LAPSE RATE BELOW FIRST INVERSION IS: -1.869

 AVERAGE WIND SPEED THRU MIXED LAYER:           1.4   M/SEC

WIND SPEED AND DIRECTION SUMMARY
  HEIGHT      WIND SPD   WIND DIR
   (M)        (M/SEC)     (DEG)
    SFC         0.0
   100.         2.2          0.
   200.         1.9        329.
   300.         8.9        169.
   500.        12.8        133.
   750.         6.7        147.
  1000.         7.9        220.
  1500.        11.5        209.
                           231.
```

```
          NINE PIPES UPPER AIR SUMMARY

            DATE: 811007      HOUR:  708

       HOLZWORTH CLASSIFICATION SCHEME FOR INVERSI
INV. BASE(M AGL)   THICKNESS (M)   TYPE   DT/DZ (C/

       0.0            224.7           3         1.201
     278.2             53.5           4         5.607
     802.6            107.0           1         0.374


MORNING MIXING HEIGHT:          97.1   M
 AVERAGE WIND SPEED THRU MIXED LAYER:                2.6

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT      WIND SPD   WIND DIR
    (M)        (M/SEC)     (DEG)
     SFC          0.0         0.
    100.          3.2       126.
    200.          0.2       231.
    300.          1.3        33.
    500.          0.8       349.
    750.          4.2       271.
   1000.          6.2       263.
   1500.          6.7       223.
   2000.          6.3       197.
```

```
          NINE PIPES UPPER AIR SUMMARY

            DATE: 811014      HOUR:  720

       HOLZWORTH CLASSIFICATION SCHEME FOR INVERSI
INV. BASE(M AGL)   THICKNESS (M)   TYPE   DT/DZ (C/

      0.0              321.0          2         1.028


MORNING MIXING HEIGHT:          56.9   M
 AVERAGE WIND SPEED THRU MIXED LAYER:                1.8

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT      WIND SPD   WIND DIR
    (M)        (M/SEC)     (DEG)
     SFC          0.4       150.
    100.          1.7       168.
    200.          2.6       198.
    300.          3.6       171.
    500.          2.7       160.
    750.          2.7       151.
   1000.          0.9       204.
   1500.          3.3         1.
   2000.          5.8         0.
```

```
          NINE PIPES UPPER AIR SUMMARY

            DATE: 811019      HOUR:  730

       HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)   THICKNESS (M)   TYPE   DT/DZ (C/10

      0.0              267.5          4         3.476
   1808.5              256.8          1         0.156


MORNING MIXING HEIGHT:          31.1   M
 AVERAGE WIND SPEED THRU MIXED LAYER:                3.4

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT      WIND SPD   WIND DIR
    (M)        (M/SEC)     (DEG)
     SFC          0.9       160.
    100.          7.5       173.
    200.          9.6       171.
    300.          9.6       181.
    500.          7.8       188.
    750.          5.5       203.
```

TABLE 4L

```
            KALISPELL UPPER AIR SUMMARY

          DATE: 811026       HOUR:  715

       HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

     42.8             42.8         1          0.234


MORNING MIXING HEIGHT:        1156.8  M
 AVERAGE WIND SPEED THRU MIXED LAYER:           10.4   M/SEC

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)       (M/SEC)    (DEG)
    SFC          5.4      259.
   100.          7.5      205.
   200.         12.8      203.
   300.         11.9      205.
   500.          6.1      197.
   750.          8.1      198.
  1000.          7.5      221.
  1500.          2.7      251.
```

```
            KALISPELL UPPER AIR SUMMARY

          DATE: 811030       HOUR:  749

       HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

     0.0              32.1         3          2.130


MORNING MIXING HEIGHT:         483.8  M
 AVERAGE WIND SPEED THRU MIXED LAYER:           5.0   M/SEC

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)       (M/SEC)    (DEG)
    SFC          0.0        0.
   100.          4.1      194.
   200.          3.3      193.
   300.          3.5      196.
   500.         11.6      214.
   750.         13.3      219.
  1000.         10.1      230.
  1500.         13.1      238.
```

```
            KALISPELL UPPER AIR SUMMARY

          DATE: 811104       HOUR:  730

       HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

     0.0             149.8         4          5.607


MORNING MIXING HEIGHT:          30.6  M
 AVERAGE WIND SPEED THRU MIXED LAYER:           0.6   M/SEC

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)       (M/SEC)    (DEG)
    SFC          0.0        0.
   100.          3.2      280.
   200.          6.9      314.
   300.          8.2      312.
   500.          7.9      286.
   750.          5.7      139.
  1000.          4.4      264.
  1500.          7.3      284.
  2000.          8.2      307.
```

```
            NINE PIPES UPPER AIR SUMMARY

          DATE: 811026       HOUR:  745

       HOLZWORTH CLASSIFICATION SCHEME FOR INVERSI
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C

     0.0             192.6         3          1.24


MORNING MIXING HEIGHT:         104.4  M
 AVERAGE WIND SPEED THRU MIXED LAYER:           3.

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)       (M/SEC)    (DEG)
    SFC          1.3      160.
   100.          4.4      164.
   200.          8.2      194.
   300.          8.5      194.
   500.          7.5      199.
   750.          6.2      215.
  1000.          6.4      226.
```

```
            NINE PIPES UPPER AIR SUMMARY

          DATE: 811030       HOUR:  753

       HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIO
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/

     0.0               0.0         0          0.0


MORNING MIXING HEIGHT:         695.7  M
 AVERAGE WIND SPEED THRU MIXED LAYER:           6.2

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)       (M/SEC)    (DEG)
    SFC          0.9      270.
   100.          3.5      261.
   200.          6.2      247.
   300.          7.7      249.
   500.          6.9      254.
   750.          7.2      263.
```

```
            NINE PIPES UPPER AIR SUMMARY

          DATE: 811104       HOUR:  758

       HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIO
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/

     0.0              74.9         4          4.939


MORNING MIXING HEIGHT:          36.8  M
 AVERAGE WIND SPEED THRU MIXED LAYER:           6.7

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)       (M/SEC)    (DEG)
    SFC          3.6      290.
   100.          8.5      289.
   200.         11.7      287.
   300.         11.4      284.
   500.          9.2      283.
   750.          6.9      290.
  1000.          5.7      287.
  1500.          4.0      237.
  2000.          7.1      209.
```

TABLE 4M

```
        KALISPELL UPPER AIR SUMMARY

         DATE: 811116      HOUR:  745

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

     74.9            321.0         2         0.997


MORNING MIXING HEIGHT:          343.2  M

 AVERAGE LAPSE RATE BELOW FIRST INVERSION IS: -4.072

 AVERAGE WIND SPEED THRU MIXED LAYER:            7.0   M/SEC

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD  WIND DIR
    (M)      (M/SEC)     (DEG)
     SFC        0.9      194.
    100.        4.5      199.
    200.        6.7      174.
    300.       11.1      171.
    500.        7.5      194.
    750.        8.4      203.
   1000.        5.3      187.
   1500.        3.2      223.
   2000.       12.5      218.
```

```
        KALISPELL UPPER AIR SUMMARY

         DATE: 811125      HOUR:  800

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

     53.5            53.5          3         1.682


MORNING MIXING HEIGHT:          342.5  M

 AVERAGE LAPSE RATE BELOW FIRST INVERSION IS: -0.748

 AVERAGE WIND SPEED THRU MIXED LAYER:            2.5   M/SEC

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD  WIND DIR
    (M)      (M/SEC)     (DEG)
     SFC        0.9      270.
    100.        1.7      290.
    200.        2.5      228.
    300.        3.6      216.
    500.        2.7      152.
    750.        2.6      219.
   1000.        5.1      246.
   1500.        9.6      292.
```

```
        KALISPELL UPPER AIR SUMMARY

         DATE: 811130      HOUR:  810

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

     21.4            96.3          3         2.077


MORNING MIXING HEIGHT:          259.1  M

 AVERAGE LAPSE RATE BELOW FIRST INVERSION IS: -2.803

 AVERAGE WIND SPEED THRU MIXED LAYER:            4.4   M/SEC

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD  WIND DIR
    (M)      (M/SEC)     (DEG)
     SFC        0.0        0.
    100.        5.2      220.
    200.        4.5      206.
    300.        2.8      197.
    500.        6.2      187.
    750.        4.9      243.
   1000.        5.8      244.
   1500.        8.2      268.
   2000.        4.5      317.
```

```
        NINE PIPES UPPER AIR SUMMARY

         DATE: 811116      HOUR:  830

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSION
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/1

      0.0            74.9          4         4.405


MORNING MIXING HEIGHT:          58.5  M
 AVERAGE WIND SPEED THRU MIXED LAYER:            1.0

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD  WIND DIR
    (M)      (M/SEC)     (DEG)
     SFC        0.9      220.
    100.        3.1      166.
    200.        2.8      150.
    300.        2.6      156.
    500.        0.7      111.
    750.        1.1      162.
   1000.        2.7      154.
   1500.        6.3      204.
   2000.       12.4      230.
```

```
        NINE PIPES UPPER AIR SUMMARY

         DATE: 811125      HOUR:  826

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/1

      0.0           128.4          1         0.389


MORNING MIXING HEIGHT:          342.7  M
 AVERAGE WIND SPEED THRU MIXED LAYER:            4.3

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD  WIND DIR
    (M)      (M/SEC)     (DEG)
     SFC        2.2      180.
    100.        4.4      179.
    200.        4.9      173.
    300.        4.4      179.
    500.        3.1      202.
    750.        5.0      241.
   1000.        4.6      262.
   1500.        5.2      282.
```

```
        NINE PIPES UPPER AIR SUMMARY

         DATE: 811130      HOUR:  903

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/10

     117.7           42.8          3         1.402


MORNING MIXING HEIGHT:          457.8  M

 AVERAGE LAPSE RATE BELOW FIRST INVERSION IS: -0.4

 AVERAGE WIND SPEED THRU MIXED LAYER:            5.2

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD  WIND DIR
    (M)      (M/SEC)     (DEG)
     SFC        3.6      160.
    100.        6.2      151.
    200.        6.4      177.
    300.        3.3      200.
    500.        6.2      219.
    750.        7.8      260.
   1000.       10.5      260.
```

TABLE 4N

```
            KALISPELL UPPER AIR SUMMARY

            DATE: 811204      HOUR:  815

        HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

      32.1              74.9        3         2.269
     278.2             417.3        1         0.264
     866.8              42.8        2         0.701


MORNING MIXING HEIGHT:         402.7  M

 AVERAGE LAPSE RATE BELOW FIRST INVERSION IS: -5.607

 AVERAGE WIND SPEED THRU MIXED LAYER:            0.9   M/SEC

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD  WIND DIR
    (M)      (M/SEC)    (DEG)
    SFC        0.0         0.
    100.       1.1       311.
    200.       0.6       248.
    300.       0.7       219.
    500.       8.2       129.
    750.       5.8       152.
   1000.       4.6       199.
   1500.       7.0       225.
   2000.       6.9       231.
```

```
            NINE PIPES UPPER AIR SUMMARY

            DATE: 811204      HOUR:  904

        HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

       0.0              64.2        4         3.271
     235.4              64.2        3         1.246
     460.2             171.2        1         0.058


MORNING MIXING HEIGHT:         91.6  M
 AVERAGE WIND SPEED THRU MIXED LAYER:            3.2  M/SE

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD  WIND DIR
    (M)      (M/SEC)    (DEG)
    SFC        2.2       360.
    100.       1.8         4.
    200.       2.0       200.
    300.       5.5       170.
    500.       8.1       166.
    750.      12.3       163.
   1000.       9.0       179.
   1500.       7.4       164.
   2000.      11.4       217.
```

```
            KALISPELL UPPER AIR SUMMARY

            DATE: 811216      HOUR:  825

        HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

       0.0             235.4        4         3.228
     331.7              64.2        3         1.246
     684.9              32.1        3         2.492
    1508.9              96.3        3         1.973


MORNING MIXING HEIGHT:         18.5  M
 AVERAGE WIND SPEED THRU MIXED LAYER:            2.3   M/SEC

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD  WIND DIR
    (M)      (M/SEC)    (DEG)
    SFC        1.3       259.
    100.       2.7       290.
    200.       3.6       321.
    300.       6.9       328.
    500.       3.5       311.
    750.       1.9       124.
   1000.       4.3       167.
   1500.       6.7       285.
   2000.       4.5       298.
```

```
            NINE PIPES UPPER AIR SUMMARY

            DATE: 811216      HOUR:  925

        HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

       0.0               0.0        0         0.0


MORNING MIXING HEIGHT:         430.3  M
 AVERAGE WIND SPEED THRU MIXED LAYER:            3.7   M/SE

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD  WIND DIR
    (M)      (M/SEC)    (DEG)
    SFC        1.3       300.
    100.       4.1       341.
    200.       5.3         3.
    300.       3.2       347.
    500.       2.6       342.
    750.       4.2       297.
   1000.      10.6       290.
   1500.       3.8       308.
```

TABLE 5A

```
          KALISPELL UPPER AIR SUMMARY

           DATE: 810408      HOUR: 1400

    HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

      0.0              0.0         0       0.0


AFTERNOON MIXING HEIGHT:       2009.4  M
 AVERAGE WIND SPEED THRU MIXED LAYER:          9.3  M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
    SFC         6.7       194.
    100.        7.3       135.
    200.        7.4       142.
    300.        9.0       165.
    500.        9.6       158.
    750.       11.2       158.
   1000.       11.9       176.
   1500.        5.2       226.
```

```
          NINE PIPES UPPER AIR SUMMARY

           DATE: 810408      HOUR: 1356

    HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

    1846.0            176.0        1       0.057


AFTERNOON MIXING HEIGHT:        742.7  M

 AVERAGE LAPSE RATE BELOW FIRST INVERSION IS: -0.618

 AVERAGE WIND SPEED THRU MIXED LAYER:         12.9  M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
    SFC         3.6       180.
    100.        9.4       170.
    200.       20.4       170.
    300.        8.9       179.
    500.       14.3       139.
    750.       12.5       185.
   1000.       12.1       186.
   1500.        4.4       174.
   2000.       22.4       194.
```

```
          KALISPELL UPPER AIR SUMMARY

           DATE: 810506      HOUR: 1357

    HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

    2511.7            165.2        3       1.271


AFTERNOON MIXING HEIGHT:       1251.4  M

 AVERAGE LAPSE RATE BELOW FIRST INVERSION IS: -0.705

 AVERAGE WIND SPEED THRU MIXED LAYER:          5.5  M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
    SFC         0.9       194.
    100.        2.9       132.
    200.        3.4       120.
    300.        4.1       128.
    500.        2.1       153.
    750.        1.7       163.
   1000.        7.9       266.
   1500.        8.0       260.
   2000.        9.7       273.
```

```
          NINE PIPES UPPER AIR SUMMARY

           DATE: 810506      HOUR: 1315

    HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

    2924.8            264.4        1       0.033


AFTERNOON MIXING HEIGHT:        750.7  M

 AVERAGE LAPSE RATE BELOW FIRST INVERSION IS: -0.619

 AVERAGE WIND SPEED THRU MIXED LAYER:          2.2  M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
    SFC         1.8       150.
    100.        1.7       147.
    200.        2.2       140.
    300.        2.4       224.
    500.        0.3       352.
    750.        3.9       237.
   1000.        2.2       247.
   1500.        9.2       276.
```

```
          KALISPELL UPPER AIR SUMMARY

           DATE: 810511      HOUR: 1400

    HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

    1949.9            264.4        2       0.946


AFTERNOON MIXING HEIGHT:       1970.5  M

 AVERAGE LAPSE RATE BELOW FIRST INVERSION IS: -0.918

 AVERAGE WIND SPEED THRU MIXED LAYER:          2.8  M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
    SFC         1.8       146.
    100.        1.6        16.
    200.        2.1       359.
    300.        1.2         4.
    500.        3.8         1.
    750.        3.4        60.
   1000.        9.2        34.
   1500.        4.0        27.
   2000.        4.3        18.
   2500.        4.2        45.
```

```
          NINE PIPES UPPER AIR SUMMARY

           DATE: 810511      HOUR: 1300

    HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

      0.0              0.0         0       0.0


AFTERNOON MIXING HEIGHT:       1724.5  M
 AVERAGE WIND SPEED THRU MIXED LAYER:          4.0  M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
    SFC         1.8       120.
    100.        4.2       118.
    200.        2.9       114.
    300.        1.4       116.
    500.        2.7        85.
    750.        2.1        38.
   1000.        5.4        73.
   1500.        5.3        75.
```

TABLE 5B

```
          KALISPELL UPPER AIR SUMMARY

          DATE: 810513      HOUR: 1400

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

     0.0               0.0          0        0.0


AFTERNOON MIXING HEIGHT:        1173.2  MNO INTERSECTION*
 AVERAGE WIND SPEED THRU MIXED LAYER:           3.5  M/SEC

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
    SFC         1.3      178.
    100.        1.1      114.
    200.        2.3      187.
    300.        3.3      206.
    500.        2.0      130.
    750.        3.2      126.
   1000.        3.8      143.
   1500.        4.0      127.
   2000.        5.7      174.
   2500.        1.9      225.
```

```
          NINE PIPES UPPER AIR SUMMARY

          DATE: 810513      HOUR: 1300

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

     0.0               0.0          0        0.0


AFTERNOON MIXING HEIGHT:        626.0  M
 AVERAGE WIND SPEED THRU MIXED LAYER:           3.5  M/SEC

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
    SFC         1.8      160.
    100.        1.4      163.
    200.        1.4      154.
    300.        3.5      149.
    500.        5.5      153.
    750.        4.4      156.
   1000.        4.5      153.
   1500.        3.1      159.
```

```
          KALISPELL UPPER AIR SUMMARY

          DATE: 810522      HOUR: 1400

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

   1041.0             264.4         1        0.227


AFTERNOON MIXING HEIGHT:        922.7  M

 AVERAGE LAPSE RATE BELOW FIRST INVERSION IS: -0.749

 AVERAGE WIND SPEED THRU MIXED LAYER:           6.9  M/SEC

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
    SFC         1.8      164.
    100.        4.8      145.
    200.        3.5      147.
    300.        7.0      137.
    500.        8.4      126.
    750.        8.4      126.
   1000.        5.6      122.
   1500.        5.6      141.
   2000.        5.0      159.
   2500.        7.1      168.
```

```
          NINE PIPES UPPER AIR SUMMARY

          DATE: 810522      HOUR: 1300

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

    413.1              99.1         2        0.807


AFTERNOON MIXING HEIGHT:        629.8  M

 AVERAGE LAPSE RATE BELOW FIRST INVERSION IS: -1.114

 AVERAGE WIND SPEED THRU MIXED LAYER:           3.7  M/SEC

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
    SFC         2.2      300.
    100.        2.9      311.
    200.        3.2      318.
    300.        1.3      297.
    500.        4.9      184.
    750.        9.6      177.
   1000.        3.0       76.
   1500.       10.4      166.
   2000.        3.1      183.
```

```
          KALISPELL UPPER AIR SUMMARY

          DATE: 810601      HOUR: 1400

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

     0.0               0.0          0        0.0


AFTERNOON MIXING HEIGHT:        1704.8  M
 AVERAGE WIND SPEED THRU MIXED LAYER:           3.8  M/SEC

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
    SFC         1.7      157.
    100.        1.1       62.
    200.        1.8       92.
    300.        2.0       98.
    500.        2.7      117.
    750.        2.0      142.
   1000.        3.0      221.
   1500.        6.8      344.
   2000.        5.1      325.
   2500.        8.6      342.
```

```
          NINE PIPES UPPER AIR SUMMARY

          DATE: 810601      HOUR: 1300

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

   2148.2             148.7         1        0.269
   2726.9             264.4         1        0.113


AFTERNOON MIXING HEIGHT:        856.2  M

 AVERAGE LAPSE RATE BELOW FIRST INVERSION IS: -0.642

 AVERAGE WIND SPEED THRU MIXED LAYER:           2.6  M/SEC

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
    SFC         2.2      180.
    100.        2.9      178.
    200.        1.9      175.
    300.        2.0      131.
    500.        3.6       98.
    750.        2.1       63.
   1000.        2.4      259.
   1500.        3.4      317.
```

TABLE 5C

```
           KALISPELL UPPER AIR SUMMARY

           DATE: 810708      HOUR: 1400

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)   THICKNESS (M)   TYPE   DT/DZ (C/100M)

    2181.2            264.4          1         0.378


AFTERNOON MIXING HEIGHT:        2260.1   M

 AVERAGE LAPSE RATE BELOW FIRST INVERSION IS: -0.958

 AVERAGE WIND SPEED THRU MIXED LAYER:              8.0   M/SEC

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT     WIND SPD   WIND DIR
    (M)       (M/SEC)     (DEG)
    SFC         3.4        194.
    100.        7.2        152.
    200.        6.2        143.
    300.        5.1        123.
    500.        6.8        121.
    750.        2.2        189.
   1000.        8.4        199.
   1500.        9.2        213.
   2000.        9.9        244.
   2500.       10.4        224.
```

```
           NINE PIPES UPPER AIR SUMMARY

           DATE: 810708      HOUR: 1400

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)   THICKNESS (M)   TYPE   DT/DZ (C/100M)

    1669.0            528.8          1         0.095


AFTERNOON MIXING HEIGHT:        1502.1   M

 AVERAGE LAPSE RATE BELOW FIRST INVERSION IS: -0.803

 AVERAGE WIND SPEED THRU MIXED LAYER:              2.6   M/SEC

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT     WIND SPD   WIND DIR
    (M)       (M/SEC)     (DEG)
    SFC         6.3        180.
    100.        1.3        192.
    200.        1.8        212.
    300.        0.4        278.
    500.        0.8        275.
    750.        1.6         49.
   1000.        2.2        173.
   1500.        8.1        216.
   2000.       13.3        226.
```

```
           KALISPELL UPPER AIR SUMMARY

           DATE: 810710      HOUR: 1400

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)   THICKNESS (M)   TYPE   DT/DZ (C/100M)

    0.0               0.0            0         0.0


AFTERNOON MIXING HEIGHT:        2036.8   M
 AVERAGE WIND SPEED THRU MIXED LAYER:              6.4   M/SEC

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT     WIND SPD   WIND DIR
    (M)       (M/SEC)     (DEG)
    SFC         1.8         34.
    100.        1.3         24.
    200.        2.4        322.
    300.        4.8        289.
    500.        3.4        299.
    750.        5.1        287.
   1000.        7.2        252.
   1500.       10.8        323.
   2000.        7.2        220.
   2500.        9.3        197.
```

```
           NINE PIPES UPPER AIR SUMMARY

           DATE: 810710      HOUR: 1400

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)   THICKNESS (M)   TYPE   DT/DZ (C/100M)

    0.0               0.0            0         0.0


AFTERNOON MIXING HEIGHT:        896.3   M
 AVERAGE WIND SPEED THRU MIXED LAYER:              4.1   M/SEC

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT     WIND SPD   WIND DIR
    (M)       (M/SEC)     (DEG)
    SFC         2.2        360.
    100.        5.9        334.
    200.        5.1        340.
    300.        4.3        351.
    500.        4.2        343.
    750.        3.2        359.
   1000.        3.8          8.
   1500.        1.7        275.
```

```
           KALISPELL UPPER AIR SUMMARY

           DATE: 810713      HOUR: 1400

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)   THICKNESS (M)   TYPE   DT/DZ (C/100M)

    0.0               0.0            0         0.0


AFTERNOON MIXING HEIGHT:        1067.6   M
 AVERAGE WIND SPEED THRU MIXED LAYER:              3.7   M/SEC

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT     WIND SPD   WIND DIR
    (M)       (M/SEC)     (DEG)
    SFC         2.2         56.
    100.        1.1        351.
    200.        1.7        304.
    300.        3.9        306.
    500.        3.1        282.
    750.        3.9        254.
   1000.        5.1        234.
   1500.        5.5        200.
   2000.       11.9        205.
   2500.        8.4        166.
```

```
           NINE PIPES UPPER AIR SUMMARY

           DATE: 810713      HOUR: 1400

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)   THICKNESS (M)   TYPE   DT/DZ (C/100M)

    0.0               0.0            0         0.0


AFTERNOON MIXING HEIGHT:        1824.9   M
 AVERAGE WIND SPEED THRU MIXED LAYER:              6.3   M/SEC

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT     WIND SPD   WIND DIR
    (M)       (M/SEC)     (DEG)
    SFC         5.4        270.
    100.        6.5        277.
    200.        7.0        284.
    300.        6.1        274.
    500.        8.7        282.
    750.        9.1        277.
   1000.        5.3        274.
   1500.        1.1        235.
```

TABLE 5D

```
          KALISPELL UPPER AIR SUMMARY

           DATE: 810715      HOUR: 1400

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)   THICKNESS (M)   TYPE   DT/DZ (C/100M)

      0.0                0.0          0          0.0


AFTERNOON MIXING HEIGHT:        1792.7  M
 AVERAGE WIND SPEED THRU MIXED LAYER:             2.5   M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT     WIND SPD   WIND DIR
    (M)       (M/SEC)     (DEG)
    SFC         0.0         0.
   100.         2.1       110.
   200.         1.6       101.
   300.         1.5        74.
   500.         0.5       225.
   750.         1.0       209.
  1000.         2.2       246.
  1500.         4.9       212.
  2000.         2.3       172.
  2500.         3.9       149.
```

```
          NINE PIPES UPPER AIR SUMMARY

           DATE: 810715      HOUR: 1420

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)   THICKNESS (M)   TYPE   DT/DZ (C/100M)

     1272.4             247.9         1          0.121


AFTERNOON MIXING HEIGHT:        1368.4   M

  AVERAGE LAPSE RATE BELOW FIRST INVERSION IS: -0.927

  AVERAGE WIND SPEED THRU MIXED LAYER:              2.0   M/SEC


  WIND SPEED AND DIRECTION SUMMARY
    HEIGHT     WIND SPD   WIND DIR
     (M)       (M/SEC)     (DEG)
     SFC         1.0        45.
    100.         0.6        23.
    200.         1.9       327.
    300.         1.6       327.
    500.         2.4       322.
    750.         3.6       289.
   1000.         2.4       242.
   1500.         5.5       221.
   2000.         8.1       234.
   2500.         6.7       252.
```

```
          KALISPELL UPPER AIR SUMMARY

           DATE: 810722      HOUR: 1400

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)   THICKNESS (M)   TYPE   DT/DZ (C/100M)

      0.0                0.0          0          0.0


AFTERNOON MIXING HEIGHT:        1785.9  M
 AVERAGE WIND SPEED THRU MIXED LAYER:             7.1   M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT     WIND SPD   WIND DIR
    (M)       (M/SEC)     (DEG)
    SFC         3.1       189.
   100.         7.1       135.
   200.        13.6       132.
   300.        14.3       130.
   500.         1.7       253.
   750.         1.5       162.
  1000.         6.0       165.
  1500.         3.1       208.
  2000.        11.8       213.
  2500.         6.7       224.
```

```
          NINE PIPES UPPER AIR SUMMARY

           DATE: 810722      HOUR: 1400

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)   THICKNESS (M)   TYPE   DT/DZ (C/100M)

      0.0                0.0          0          0.0


AFTERNOON MIXING HEIGHT:        1600.0  M
 AVERAGE WIND SPEED THRU MIXED LAYER:             2.4   M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT     WIND SPD   WIND DIR
    (M)       (M/SEC)     (DEG)
    SFC         0.9       360.
   100.         2.5        50.
   200.         2.4        47.
   300.         1.8        50.
   500.         2.2        33.
   750.         2.1        47.
  1000.         2.2        36.
  1500.         2.7        17.
  2000.         3.0         7.
  2500.         5.3       322.
```

```
          KALISPELL UPPER AIR SUMMARY

           DATE: 810727      HOUR: 1400

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)   THICKNESS (M)   TYPE   DT/DZ (C/100M)

      0.0                0.0          0          0.0


AFTERNOON MIXING HEIGHT:         545.6  M
 AVERAGE WIND SPEED THRU MIXED LAYER:             8.2   M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT     WIND SPD   WIND DIR
    (M)       (M/SEC)     (DEG)
    SFC         7.2       173.
   100.         8.0       137.
   200.         9.4       134.
   300.         8.2       144.
   500.         8.1       138.
   750.         8.0       140.
  1000.         4.7       149.
  1500.         2.4       204.
  2000.         7.8       263.
  2500.         9.2       257.
```

```
          NINE PIPES UPPER AIR SUMMARY

           DATE: 810727      HOUR: 1400

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)   THICKNESS (M)   TYPE   DT/DZ (C/100M)

      0.0                0.0          0          0.0


AFTERNOON MIXING HEIGHT:         926.3  M
 AVERAGE WIND SPEED THRU MIXED LAYER:             3.0   M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT     WIND SPD   WIND DIR
    (M)       (M/SEC)     (DEG)
    SFC         2.2       150.
   100.         2.3       122.
   200.         3.2       131.
   300.         3.0       122.
   500.         3.3       115.
   750.         2.9       123.
  1000.         2.1       184.
  1500.         4.8       222.
  2000.         7.4       235.
  2500.         6.9       260.
```

TABLE 5E

```
          KALISPELL UPPER AIR SUMMARY

           DATE: 810814     HOUR: 1400

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)   THICKNESS (M)   TYPE   DT/DZ (C/100M)

      0.0               0.0          0        0.0


AFTERNOON MIXING HEIGHT:        1309.8  M
 AVERAGE WIND SPEED THRU MIXED LAYER:           3.5  M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
    SFC         0.9       227.
   100.         3.7       220.
   200.         2.9       204.
   300.         2.8       221.
   500.         4.8       208.
   750.         2.7       219.
  1000.         2.6       235.
  1500.         2.8       271.
  2000.         4.3       281.
  2500.         4.3       309.
```

```
          KALISPELL UPPER AIR SUMMARY

           DATE: 810819     HOUR: 1400

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)   THICKNESS (M)   TYPE   DT/DZ (C/100M)

     561.8              198.3        2        0.605


AFTERNOON MIXING HEIGHT:        478.5  M

 AVERAGE LAPSE RATE BELOW FIRST INVERSION IS: -0.552

 AVERAGE WIND SPEED THRU MIXED LAYER:           3.4  M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
    SFC         1.3       216.
   100.         2.7       130.
   200.         3.5       134.
   300.         3.4       160.
   500.         3.8       164.
   750.         6.6       159.
  1000.         4.4       181.
  1500.         4.2       236.
  2000.         5.4       165.
  2500.         2.7       128.
```

```
          KALISPELL UPPER AIR SUMMARY

           DATE: 810824     HOUR: 1400

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)   THICKNESS (M)   TYPE   DT/DZ (C/100M)

      0.0               0.0          0        0.0


AFTERNOON MIXING HEIGHT:        1578.9  M
 AVERAGE WIND SPEED THRU MIXED LAYER:           1.8  M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
    SFC         1.3       131.
   100.         1.1        75.
   200.         0.9        60.
   300.         0.7        53.
   500.         3.5       356.
   750.         1.1        51.
  1000.         2.3        54.
  1500.         1.8        74.
  2000.         3.5        80.
  2500.         3.1        98.
```

```
          NINE PIPES UPPER AIR SUMMARY

           DATE: 810814     HOUR: 1400

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)   THICKNESS (M)   TYPE   DT/DZ (C/100M)

      0.0               0.0          0        0.0


AFTERNOON MIXING HEIGHT:        2490.0  M
 AVERAGE WIND SPEED THRU MIXED LAYER:           2.9  M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
    SFC         2.2       248.
   100.         4.1       254.
   200.         3.5       248.
   300.         1.1       266.
   500.         0.5         0.
   750.         2.0       307.
  1000.         0.6        16.
  1500.         0.8       220.
  2000.         4.1       222.
  2500.         3.4       232.
```

```
          NINE PIPES UPPER AIR SUMMARY

           DATE: 810819     HOUR: 1400

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)   THICKNESS (M)   TYPE   DT/DZ (C/100M)

      0.0               0.0          0        0.0


AFTERNOON MIXING HEIGHT:        507.1  M
 AVERAGE WIND SPEED THRU MIXED LAYER:           4.9  M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
    SFC         0.9       270.
   100.         5.3        89.
   200.         6.0        85.
   300.         4.5        91.
   500.         4.0        84.
   750.         3.6       168.
  1000.         5.2       248.
  1500.         4.1       291.
  2000.         8.5       269.
  2500.         6.1       300.
```

```
          NINE PIPES UPPER AIR SUMMARY

           DATE: 810824     HOUR: 1400

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)   THICKNESS (M)   TYPE   DT/DZ (C/100M)

     601.0              82.6         2        0.847


AFTERNOON MIXING HEIGHT:        1049.4  M

 AVERAGE LAPSE RATE BELOW FIRST INVERSION IS: -1.210

 AVERAGE WIND SPEED THRU MIXED LAYER:           2.3  M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
    SFC         1.8        30.
   100.         2.8       355.
   200.         2.1         2.
   300.         1.1       327.
   500.         1.4       314.
   750.         2.5       201.
  1000.         1.6       183.
  1500.         3.7       167.
  2000.         4.3       156.
  2500.         6.9       129.
```

TABLE 5F

```
          KALISPELL UPPER AIR SUMMARY

           DATE: 810826     HOUR: 1400

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

      0.0               0.0        0         0.0


AFTERNOON MIXING HEIGHT:        2140.0  M
 AVERAGE WIND SPEED THRU MIXED LAYER:            5.5  M/SEC

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT     WIND SPD  WIND DIR
    (M)       (M/SEC)    (DEG)
    SFC          1.3        2.
   100.          1.7      177.
   200.          2.5      210.
   300.          3.0      261.
   500.          3.0      236.
   750.          1.5      245.
  1000.          2.8       98.
  1500.          8.4      134.
  2000.         10.8      115.
  2500.          6.6      136.
```

```
          NINE PIPES UPPER AIR SUMMARY

           DATE: 810826     HOUR: 1410

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

     826.2              82.6       3         1.210


AFTERNOON MIXING HEIGHT:        873.2  M

 AVERAGE LAPSE RATE BELOW FIRST INVERSION IS: -0.884

 AVERAGE WIND SPEED THRU MIXED LAYER:            4.1  M/SEC

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT     WIND SPD  WIND DIR
    (M)       (M/SEC)    (DEG)
    SFC          2.2      360.
   100.          4.8       15.
   200.          5.2        5.
   300.          4.2        1.
   500.          6.6      344.
   750.          2.2      335.
  1000.          3.2      139.
```

```
          KALISPELL UPPER AIR SUMMARY

           DATE: 810831     HOUR: 1400

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

     594.9             198.3       1         0.202
     958.4             132.2       1         0.076


AFTERNOON MIXING HEIGHT:        867.2  M

 AVERAGE LAPSE RATE BELOW FIRST INVERSION IS: -1.076

 AVERAGE WIND SPEED THRU MIXED LAYER:            5.9  M/SEC

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT     WIND SPD  WIND DIR
    (M)       (M/SEC)    (DEG)
    SFC          2.7      356.
   100.          4.2      165.
   200.          2.4      167.
   300.          2.1      150.
   500.          6.0      139.
   750.          9.6      127.
  1000.          4.6      115.
  1500.          4.3      234.
  2000.          9.7      264.
  2500.          7.1      205.
```

```
          NINE PIPES UPPER AIR SUMMARY

           DATE: 810831     HOUR: 1400

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

      0.0               0.0        0         0.0


AFTERNOON MIXING HEIGHT:        659.2  M
 AVERAGE WIND SPEED THRU MIXED LAYER:            2.2  M/SEC

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT     WIND SPD  WIND DIR
    (M)       (M/SEC)    (DEG)
    SFC          1.8      190.
   100.          1.3      127.
   200.          2.0      141.
   300.          2.3      145.
   500.          2.2       92.
   750.          4.2      141.
  1000.          5.8      172.
  1500.          3.4      164.
  2000.          1.3       -0.
  2500.          4.9      223.
```

```
          KALISPELL UPPER AIR SUMMARY

           DATE: 810902     HOUR: 1400

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

      0.0               0.0        0         0.0


AFTERNOON MIXING HEIGHT:        739.6  M
 AVERAGE WIND SPEED THRU MIXED LAYER:            9.0  M/SEC

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT     WIND SPD  WIND DIR
    (M)       (M/SEC)    (DEG)
    SFC          1.3      184.
   100.          4.8      110.
   200.          8.6      104.
   300.          4.7      111.
   500.         11.5      119.
   750.         10.3      125.
  1000.         13.5      142.
  1500.          5.8      174.
  2000.          5.8      185.
  2500.          8.0      202.
```

```
          NINE PIPES UPPER AIR SUMMARY

           DATE: 810902     HOUR: 1400

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

    2561.3             264.4       1         0.340


AFTERNOON MIXING HEIGHT:        2687.2  M

 AVERAGE LAPSE RATE BELOW FIRST INVERSION IS: -0.988

 AVERAGE WIND SPEED THRU MIXED LAYER:            4.0  M/SEC

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT     WIND SPD  WIND DIR
    (M)       (M/SEC)    (DEG)
    SFC          2.2      120.
   100.          1.6      137.
   200.          1.7      154.
   300.          2.6      171.
   500.          1.5      205.
   750.          2.7      227.
  1000.          2.8      200.
  1500.          5.3      230.
  2000.          3.9      231.
  2500.          3.5      254.
```

TABLE 5G

```
          KALISPELL UPPER AIR SUMMARY

           DATE: 810904     HOUR: 1400

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

    859.3            264.4          2          0.832


AFTERNOON MIXING HEIGHT:       1067.1  M
 AVERAGE LAPSE RATE BELOW FIRST INVERSION IS: -1.210
 AVERAGE WIND SPEED THRU MIXED LAYER:            1.4   M/SEC

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT     WIND SPD   WIND DIR
    (M)       (M/SEC)     (DEG)
    SFC         0.9       340.
   100.         0.3       346.
   200.         1.1       330.
   300.         1.7       328.
   500.         0.3       325.
   750.         0.9       180.
  1000.         1.9       226.
  1500.         2.5       223.
  2000.         1.9       216.
  2500.         2.5       190.
```

```
          NINE PIPES UPPER AIR SUMMARY

           DATE: 810904     HOUR: 1355

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

    826.2            264.4          4          1.820


AFTERNOON MIXING HEIGHT:       1086.3  M
 AVERAGE LAPSE RATE BELOW FIRST INVERSION IS: -2.275
 AVERAGE WIND SPEED THRU MIXED LAYER:            3.6   M/SEC

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT     WIND SPD   WIND DIR
    (M)       (M/SEC)     (DEG)
    SFC         1.7       230.
   100.         3.0       300.
   200.         2.1       303.
   300.         1.3       281.
   500.         1.5       266.
   750.         5.1       255.
  1000.         4.5       202.
  1500.         2.4       275.
  2000.         7.5       303.
  2500.         8.5       260.
```

```
          KALISPELL UPPER AIR SUMMARY

           DATE: 810916     HOUR: 1400

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

    1404.6           132.2          2          0.530


AFTERNOON MIXING HEIGHT:        430.2  M
 AVERAGE LAPSE RATE BELOW FIRST INVERSION IS: -0.449
 AVERAGE WIND SPEED THRU MIXED LAYER:            4.5   M/SEC

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT     WIND SPD   WIND DIR
    (M)       (M/SEC)     (DEG)
    SFC         1.3       167.
   100.         3.3       125.
   200.         4.1       118.
   300.         4.4       141.
   500.         4.7       141.
   750.         7.0       121.
  1000.         6.6       137.
  1500.         4.3       303.
  2000.         2.4       249.
  2500.         2.8       163.
```

```
          NINE PIPES UPPER AIR SUMMARY

           DATE: 810916     HOUR: 1400

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

    578.4            181.8          2          0.605


AFTERNOON MIXING HEIGHT:       2316.1  M
 AVERAGE LAPSE RATE BELOW FIRST INVERSION IS: -2.680
 AVERAGE WIND SPEED THRU MIXED LAYER:            2.9   M/SEC

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT     WIND SPD   WIND DIR
    (M)       (M/SEC)     (DEG)
    SFC         2.4       326.
   100.         1.6       317.
   200.         1.7       355.
   300.         1.5         2.
   500.         1.1        16.
   750.         1.9       148.
  1000.         3.0       172.
  1500.         3.8       164.
  2000.         3.3       144.
  2500.         0.2       359.
```

```
          KALISPELL UPPER AIR SUMMARY

           DATE: 810923     HOUR: 1400

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

      0.0              0.0          0          0.0


AFTERNOON MIXING HEIGHT:       1081.3  M
 AVERAGE WIND SPEED THRU MIXED LAYER:            6.7   M/SEC

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT     WIND SPD   WIND DIR
    (M)       (M/SEC)     (DEG)
    SFC         2.7        45.
   100.         6.5       158.
   200.         6.7       155.
   300.         8.0       143.
   500.         7.2       146.
   750.         4.5       104.
  1000.         3.7       134.
  1500.         3.2       195.
  2000.         2.3       224.
  2500.         5.5       213.
```

```
          NINE PIPES UPPER AIR SUMMARY

           DATE: 810923     HOUR: 1401

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

      0.0              0.0          0          0.0


AFTERNOON MIXING HEIGHT:        586.5  M
 AVERAGE WIND SPEED THRU MIXED LAYER:            4.1   M/SEC

 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT     WIND SPD   WIND DIR
    (M)       (M/SEC)     (DEG)
    SFC         1.3       160.
   100.         2.2       101.
   200.         3.7        95.
   300.         4.2       119.
   500.         4.1       109.
   750.         1.6       243.
  1000.         3.2       270.
  1500.         3.0       187.
  2000.         4.5       153.
  2500.        10.0       176.
```

TABLE 5H

```
            KALISPELL UPPER AIR SUMMARY

            DATE: 810925      HOUR: 1400

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)   THICKNESS (M)  TYPE   DT/DZ (C/100M)

    2511.7             231.3        1         0.086


AFTERNOON MIXING HEIGHT:          531.4  M

 AVERAGE LAPSE RATE BELOW FIRST INVERSION IS: -0.721

 AVERAGE WIND SPEED THRU MIXED LAYER:            4.7  M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
     SFC        2.7        45.
    100.        8.2       308.
    200.        3.6       308.
    300.        2.2       315.
    500.        5.0       299.
    750.        3.4       208.
   1000.        3.1       200.
   1500.        5.2       162.
   2000.        6.9       192.
   2500.        3.3       236.
```

```
            NINE PIPES UPPER AIR SUMMARY

            DATE: 810925      HOUR: 1415

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)   THICKNESS (M)  TYPE   DT/DZ (C/100M)

      0.0                0.0         0          0.0


AFTERNOON MIXING HEIGHT:          950.8  M
 AVERAGE WIND SPEED THRU MIXED LAYER:            4.1  M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
     SFC        3.1       160.
    100.        3.3       133.
    200.        3.3       152.
    300.        4.2       153.
    500.        4.9       184.
    750.        3.7       227.
   1000.        7.3       245.
   1500.        8.7       238.
   2000.        7.1       250.
```

```
            KALISPELL UPPER AIR SUMMARY

            DATE: 811005      HOUR: 1400

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)   THICKNESS (M)  TYPE   DT/DZ (C/100M)

      0.0                0.0         0          0.0


AFTERNOON MIXING HEIGHT:         2140.2  M NO INTERSECTION*
 AVERAGE WIND SPEED THRU MIXED LAYER:            6.5  M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
     SFC        6.7       169.
    100.        1.3       146.
    200.        2.2       145.
    300.        3.0       135.
    500.        6.0       145.
    750.        5.7       144.
   1000.        6.6       175.
   1500.        7.6       186.
   2000.        7.9       210.
```

```
            NINE PIPES UPPER AIR SUMMARY

            DATE: 811005      HOUR: 1356

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)   THICKNESS (M)  TYPE   DT/DZ (C/100M)

      0.0                0.0         0          0.0


AFTERNOON MIXING HEIGHT:         1010.0  M
 AVERAGE WIND SPEED THRU MIXED LAYER:            3.9  M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
     SFC        0.9       160.
    100.        1.5       147.
    200.        1.5       147.
    300.        2.5       199.
    500.        2.0       144.
    750.        4.9       155.
   1000.        8.5       160.
   1500.        7.9       187.
   2000.        7.4       214.
```

```
            NINE PIPES UPPER AIR SUMMARY

            DATE: 811009      HOUR: 1403

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)   THICKNESS (M)  TYPE   DT/DZ (C/100M)

      0.0                0.0         0          0.0


AFTERNOON MIXING HEIGHT:         2140.2  M NO INTERSECTION*
 AVERAGE WIND SPEED THRU MIXED LAYER:            7.3  M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
     SFC        6.9       191.
    100.        8.7       196.
    200.       10.2       203.
    300.       10.4       196.
    500.        8.9       202.
    750.        7.7       198.
   1000.       10.0       211.
   1500.        3.3       303.
   2000.        9.3       234.
```

```
            KALISPELL UPPER AIR SUMMARY

            DATE: 811009      HOUR: 1400

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)   THICKNESS (M)  TYPE   DT/DZ (C/100M)

      0.0                0.0         0          0.0


AFTERNOON MIXING HEIGHT:         2140.2  M NO INTERSECTION*
 AVERAGE WIND SPEED THRU MIXED LAYER:            9.2  M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
     SFC        5.8       281.
    100.       11.4       240.
    200.       12.3       237.
    300.        6.7       244.
    500.        5.6       218.
    750.        3.1        91.
   1000.        5.2       219.
   1500.       13.6       217.
   2000.       11.3       207.
```

TABLE 5I

```
         KALISPELL UPPER AIR SUMMARY

          DATE: 811021      HOUR: 1400

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

      21.4             32.1         2         0.023


AFTERNOON MIXING HEIGHT:        2058.9   M

 AVERAGE LAPSE RATE BELOW FIRST INVERSION IS:-14.952

 AVERAGE WIND SPEED THRU MIXED LAYER:           3.3   M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
     SFC        0.9       243.
    100.        1.2       175.
    200.        1.4       172.
    300.        1.3       182.
    500.        0.7       152.
    750.        1.5       227.
   1000.        2.4       223.
   1500.        4.1       228.
   2000.        3.7       237.
```

```
         NINE PIPES UPPER AIR SUMMARY

          DATE: 811021      HOUR: 1403

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

     1658.7            171.2        1         0.058


AFTERNOON MIXING HEIGHT:        1003.7   M

 AVERAGE LAPSE RATE BELOW FIRST INVERSION IS: -0.093

 AVERAGE WIND SPEED THRU MIXED LAYER:           1.1   M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
     SFC        1.3       180.
    100.        1.5       192.
    200.        0.4       215.
    300.        0.7       236.
    500.        1.0        83.
    750.        1.3        22.
   1000.        1.9       120.
   1500.        2.6       203.
   2000.        3.0       237.
```

```
         KALISPELL UPPER AIR SUMMARY

          DATE: 811028      HOUR: 1400

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

      246.1            85.6         3         2.453


AFTERNOON MIXING HEIGHT:        317.3   M

 AVERAGE LAPSE RATE BELOW FIRST INVERSION IS: -1.136

 AVERAGE WIND SPEED THRU MIXED LAYER:           1.0   M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
     SFC        0.9       313.
    100.        1.3       157.
    200.        1.3       197.
    300.        1.4       165.
    500.        9.9       136.
    750.        6.0       203.
   1000.       11.4       193.
   1500.       10.7       202.
```

```
         NINE PIPES UPPER AIR SUMMARY

          DATE: 811028      HOUR: 1418

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

      342.4            32.1         3         2.180


AFTERNOON MIXING HEIGHT:        344.8   M

 AVERAGE LAPSE RATE BELOW FIRST INVERSION IS: -0.438

 AVERAGE WIND SPEED THRU MIXED LAYER:           2.4   M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
     SFC        0.0        40.
    100.        2.7        65.
    200.        2.5        62.
    300.        3.4       269.
    500.        7.0       268.
    750.        6.4       246.
   1000.        4.6       209.
   1500.       13.2       200.
```

```
         KALISPELL UPPER AIR SUMMARY

          DATE: 811104      HOUR: 1400

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

      0.0              0.0          0         0.0


AFTERNOON MIXING HEIGHT:        1840.6   M
 AVERAGE WIND SPEED THRU MIXED LAYER:           2.0   M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
     SFC        0.2       351.
    100.        0.6       299.
    200.        1.3       261.
    300.        1.3       262.
    500.        1.8       291.
    750.        1.9       287.
   1000.        3.3       298.
   1500.        4.6       306.
   2000.        2.0       352.
```

```
         NINE PIPES UPPER AIR SUMMARY

          DATE: 811104      HOUR: 1413

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

     1541.0            64.2         1         0.311


AFTERNOON MIXING HEIGHT:        668.6   M

 AVERAGE LAPSE RATE BELOW FIRST INVERSION IS: -0.506

 AVERAGE WIND SPEED THRU MIXED LAYER:           1.6   M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD   WIND DIR
    (M)      (M/SEC)     (DEG)
     SFC        1.3       290.
    100.        1.4       237.
    200.        0.7       300.
    300.        1.1       320.
    500.        2.0       294.
    750.        2.8       310.
   1000.        3.2       353.
   1500.        8.2       351.
   2000.        6.4       349.
```

TABLE 5J

```
          KALISPELL UPPER AIR SUMMARY

            DATE: 811118      HOUR: 1400

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

      0.0               0.0         0         0.0


AFTERNOON MIXING HEIGHT:        1110.0  M
 AVERAGE WIND SPEED THRU MIXED LAYER:          5.5   M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD  WIND DIR
    (M)      (M/SEC)     (DEG)
     SFC        2.7       184.
    100.        3.6       156.
    200.        3.2       170.
    300.        4.1       221.
    500.        4.3       238.
    750.        5.3       251.
   1000.        8.7       268.
   1500.        8.6       299.
   2000.       11.4       310.
```

```
          NINE PIPES UPPER AIR SUMMARY

            DATE: 811118      HOUR: 1425

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

      0.0               0.0         0         0.0


AFTERNOON MIXING HEIGHT:        500.5  M
 AVERAGE WIND SPEED THRU MIXED LAYER:          3.2   M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD  WIND DIR
    (M)      (M/SEC)     (DEG)
     SFC        0.9       180.
    100.        3.5       134.
    200.        1.7       160.
    300.        2.0       242.
    500.        5.2       265.
    750.        6.0       264.
   1000.        8.1       272.
   1500.       11.6       287.
```

```
          KALISPELL UPPER AIR SUMMARY

            DATE: 811127      HOUR: 1400

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

      0.0               0.0         0         0.0


AFTERNOON MIXING HEIGHT:        693.6  M
 AVERAGE WIND SPEED THRU MIXED LAYER:          2.5   M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD  WIND DIR
    (M)      (M/SEC)     (DEG)
     SFC        2.7        34.
    100.        5.6        27.
    200.        3.3        40.
    300.        2.1        45.
    500.        1.3        44.
    750.        0.2       126.
   1000.        3.6       139.
   1500.        4.0       127.
   2000.       11.2       121.
```

```
          NINE PIPES UPPER AIR SUMMARY

            DATE: 811127      HOUR: 1400

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

      288.9             74.9        1         0.400


AFTERNOON MIXING HEIGHT:        629.8  M

 AVERAGE LAPSE RATE BELOW FIRST INVERSION IS: -1.073

 AVERAGE WIND SPEED THRU MIXED LAYER:          2.5   M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD  WIND DIR
    (M)      (M/SEC)     (DEG)
     SFC        1.3       180.
    100.        1.9       217.
    200.        2.5       240.
    300.        2.3       248.
    500.        3.3       269.
    750.        1.7       325.
   1000.        0.9        11.
```

```
          KALISPELL UPPER AIR SUMMARY

            DATE: 811204      HOUR: 1400

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

      192.6             149.8       2         0.601
      492.3             160.5       1         0.374
      595.2              96.3       2         0.519


AFTERNOON MIXING HEIGHT:        614.4  M

 AVERAGE LAPSE RATE BELOW FIRST INVERSION IS: -2.388

 AVERAGE WIND SPEED THRU MIXED LAYER:          2.2   M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD  WIND DIR
    (M)      (M/SEC)     (DEG)
     SFC        0.0         0.
    100.        1.1       328.
    200.        1.2       334.
    300.        0.4        16.
    500.        5.8       142.
    750.        5.6       152.
   1000.        9.1       168.
   1500.       11.5       191.
   2000.       11.1       178.
```

```
          NINE PIPES UPPER AIR SUMMARY

            DATE: 811204      HOUR: 1400

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

      246.1             171.2       1         0.058
      513.7             171.2       2         1.051


AFTERNOON MIXING HEIGHT:        278.1  M

 AVERAGE LAPSE RATE BELOW FIRST INVERSION IS: -0.325

 AVERAGE WIND SPEED THRU MIXED LAYER:          1.3   M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT    WIND SPD  WIND DIR
    (M)      (M/SEC)     (DEG)
     SFC        1.7       280.
    100.        2.0       320.
    200.        0.5       341.
    300.        1.6       153.
    500.        4.5       159.
    750.       10.4       164.
   1000.       10.1       166.
   1500.        9.3       203.
   2000.       15.0       234.
```

TABLE 5K

```
        NINE PIPES UPPER AIR SUMMARY

         DATE: 811216      HCUR: 1401

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

      0.0              0.0         0        0.0


AFTERNCCN MIXING HEIGHT:           410.0  M
 AVERAGE WIND SPEED THRU MIXED LAYER:              3.4   M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT     WIND SPD   WIND DIR
    (M)       (M/SEC)     (DEG)
    SFC          0.7        45.
   100.          3.7       358.
   200.          3.8       350.
   300.          4.2       355.
   500.          0.5        72.
   750.          1.3       215.
  1000.          3.5       243.
  1500.          2.7       236.
```

```
        KALISPELL UPPER AIR SUMMARY

         DATE: 811216      HCUR: 1400

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

      85.0             32.1         3        1.869


AFTERNOON MIXING HEIGHT:           601.2  M

 AVERAGE LAPSE RATE BELOW FIRST INVERSION IS: -3.855

 AVERAGE WIND SPEED THRU MIXED LAYER:              2.0   M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT     WIND SPD   WIND DIR
    (M)       (M/SEC)     (DEG)
    SFC          0.0         0.
   100.          0.3       140.
   200.          2.7       315.
   300.          5.8       303.
   500.          2.1       205.
   750.          4.2       238.
  1000.          4.4       239.
  1500.          3.7       218.
```

```
        KALISPELL UPPER AIR SUMMARY

         DATE: 811221      HCUR: 1400

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

      32.1             513.7        2        0.681


AFTERNCCN MIXING HEIGHT:           182.4  M

 AVERAGE LAPSE RATE BELOW FIRST INVERSION IS: -5.918

 AVERAGE WIND SPEED THRU MIXED LAYER:              1.9   M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT     WIND SPD   WIND DIR
    (M)       (M/SEC)     (DEG)
    SFC          0.9       173.
   100.          2.3       192.
   200.          1.4       125.
   300.          1.1       300.
   500.          4.4       334.
   750.          0.7       168.
  1000.          2.2       259.
  1500.          2.3       249.
```

```
        NINE PIPES UPPER AIR SUMMARY

         DATE: 811221      HCUR: 1424

     HOLZWORTH CLASSIFICATION SCHEME FOR INVERSIONS
INV. BASE(M AGL)  THICKNESS (M)  TYPE  DT/DZ (C/100M)

      21.4             42.8         4        4.439


AFTERNOON MIXING HEIGHT:           96.8  M**QUESTIONABLE**

 AVERAGE LAPSE RATE BELOW FIRST INVERSION IS: -3.738

 AVERAGE WIND SPEED THRU MIXED LAYER:              2.0   M/SEC


 WIND SPEED AND DIRECTION SUMMARY
   HEIGHT     WIND SPD   WIND DIR
    (M)       (M/SEC)     (DEG)
    SFC          1.3       360.
   100.          2.0        92.
   200.          1.1       106.
   300.          1.6       306.
   500.          2.3       271.
   750.          7.4       257.
  1000.          8.8       268.
  1500.         11.7       274.
  2000.          9.8       286.
```

Table 6

Kalispell GIA vs Ninepipes

First Inversion Occurrence Frequency (percent)
Most Common Base Height and Thickness by Time and Month
from Acoustic Radar
1981

Month		0001-0600 MST			0601-1200 MST			1201-1800 MST			1801-2400 MST		
		(%)	Base	Thickness Code*	(%)	Base	Thickness Code*	(%)	Base	Thickness Code*	(%)	Base	Thickness Code*
Jan	GIA	--	--	--	--	--	--	--	--	--	--	--	--
	NP	(100)	sfc	2	(100)	sfc	2	(78)	100	2	(100)	sfc	2
Feb	GIA	(100)	sfc	3	(91)	sfc	2	(58)	sfc	2	(100)	sfc	2
	NP	--	--	--	--	--	--	--	--	--	--	--	--
Mar	GIA	(100)	sfc	3	(100)	100	3	(31)	100	2	(100)	sfc	2
	NP	(63)	sfc	3	(58)	100	3	(21)	100	2	(67)	sfc	2
Apr	GIA	(100)	sfc	3	(73)	100	3	(16)	100	1	(97)	sfc	2
	NP	(71)	sfc	3	(46)	200	2	(12)	300	2	(71)	sfc	2
May	GIA	(100)	sfc	3	(81)	100	2	(10)	300	2	(100)	sfc	1
	NP	(74)	sfc	3	(58)	200	2	(13)	400	2	(77)	sfc	2
June	GIA	(100)	sfc	3	(87)	100	2	(23)	sfc	2	(100)	sfc	2
	NP	(77)	sfc	3	(52)	100	2	(8)	100	2	(81)	sfc	2
July	GIA	(100)	sfc	4	(68)	200	2	(11)	200	2	(100)	sfc	2
	NP	(89)	sfc	2	(58)	100	3	(15)	sfc	2	(89)	sfc	2
Aug	GIA	(100)	sfc	3	(97)	200	2	(6)	200	2	(100)	sfc	2
	NP	(75)	sfc	3	(75)	200	2	(21)	200	2	(79)	sfc	2
Sep	GIA	(93)	sfc	3	(90)	200	2	(13)	100	3	(93)	sfc	2
	NP	(87)	sfc	3	(80)	200	2	(17)	300	2	(90)	sfc	2
Oct	GIA	(100)	sfc	3	(100)	sfc	2	(42)	200	2	(100)	sfc	3
	NP	(100)	sfc	3	(97)	200	2	(31)	200	2	(100)	sfc	3
Nov	GIA	(100)	sfc	3	(100)	sfc	4	(80)	sfc	2	(100)	sfc	3
	NP	(100)	sfc	3	(86)	sfc	3	(76)	100	2	(100)	sfc	3
Dec	GIA	(100)	sfc	3	(100)	sfc	3	(77)	sfc	3	(100)	sfc	3
	NP	(100)	sfc	3	(93)	sfc	2	(97)	200	2	(100)	sfc	2

*Thickness Code:
1 - 1-100 meters
2 - 101-300 meters
3 - 301-500 meters
4 - 501-900 meters

TABLE 7

Kalispell-GIA vs. Ninepipes
Percent Frequency of Stability Classification
1981

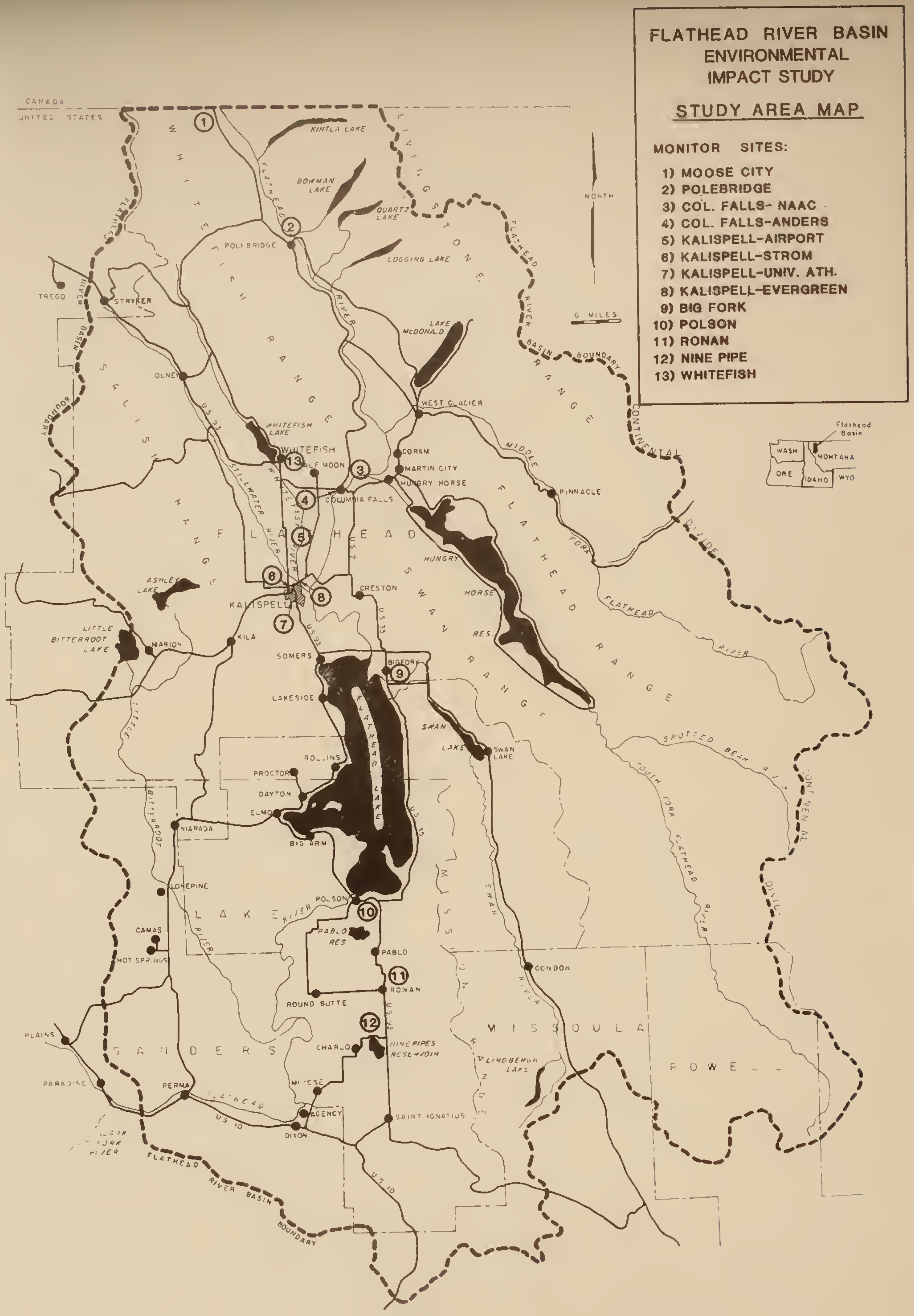
Category

Month		A	B	C	D	E	F	U	M
Jan	GIA	0	0	0	0	0	0	0	100
	NP	0	4.0	2.4	6.5	12.4	0.5	28.8	45.4
Feb	GIA	0	0.3	3.3	9.2	23.8	2.7	0	60.7
	NP	0	0	0	0	0	0	86.9	13.1
Mar	GIA	0	2.4	23.4	19.6	30.1	24.5	0	0
	NP	0	1.3	13.4	9.1	18.8	12.6	33.1	1.6
Apr	GIA	0	1.1	28.3	20.0	41.7	8.9	0	0
	NP	0	1.1	20.8	7.5	25.3	6.4	19.4	19.4
May	GIA	0.3	4.3	29.3	18.5	38.7	8.9	0	0
	NP	0.3	3.0	22.3	18.3	25.8	8.1	22.0	0.3
June	GIA	0.3	0	29.4	21.4	36.7	12.2	0	0
	NP	0.3	0	20.8	20.8	19.4	8.3	16.9	13.3
July	GIA	0.8	1.9	31.5	13.2	23.9	17.7	1.1	9.9
	NP	0.8	1.6	25.0	11.8	21.2	14.5	8.1	16.9
Aug	GIA	0	5.4	29.8	14.0	22.3	28.5	0	0
	NP	0	4.8	21.22	8.1	15.6	21.8	10.8	17.7
Sep	GIA	0	1.1	26.9	11.1	25.3	27.5	8.1	0
	NP	0	1.7	26.4	12.2	23.1	25.6	9.7	1.4
Oct	GIA	0	0.5	19.9	12.4	45.2	22.0	0	0
	NP	0	1.3	23.7	14.2	33.9	20.4	1.9	4.6
Nov	GIA	0	3.1	12.8	12.2	54.2	17.8	0	0
	NP	0	1.9	9.7	11.7	38.6	0.7	2.5	28.9
Dec	GIA	0	1.1	6.2	13.2	68.3	10.8	0.5	0
	NP	0	0.5	7.8	10.5	24.7	4.0	43.5	8.9

A Very unstable
B Moderately Unstable
C Slightly Unstable
D Neutral

E Slightly Stable
F Moderately Stable
U Unknown
M Missing

FIGURES



FLATHEAD RIVER BASIN ENVIRONMENTAL IMPACT STUDY

STUDY AREA MAP

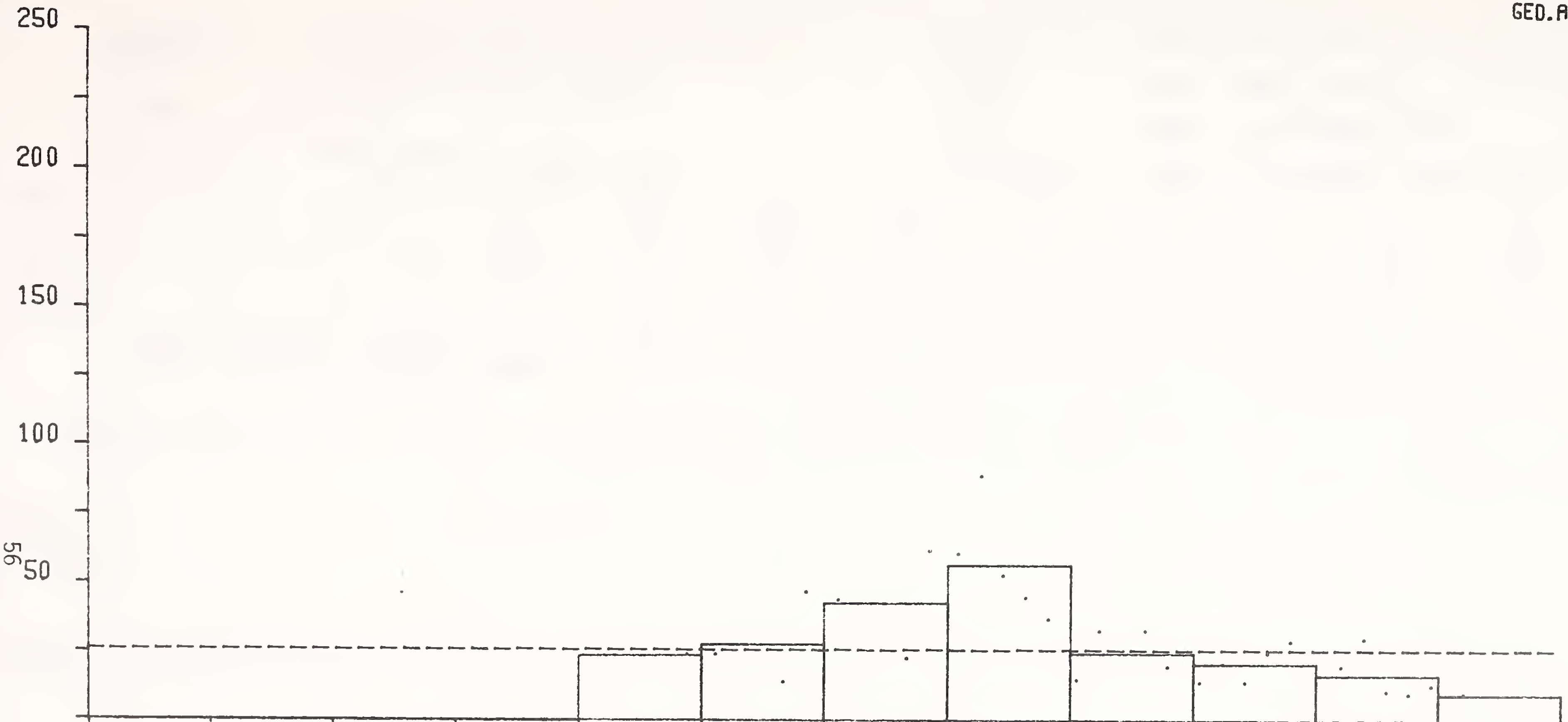
MONITOR SITES:

1) MOOSE CITY
2) POLEBRIDGE
3) COL. FALLS- NAAC
4) COL. FALLS-ANDERS
5) KALISPELL-AIRPORT
6) KALISPELL-STROM
7) KALISPELL-UNIV. ATH.
8) KALISPELL-EVERGREEN
9) BIG FORK
10) POLSON
11) RONAN
12) NINE PIPE
13) WHITEFISH

Figure 2-A

1981

GEO.AVG = 26



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
NUM-OBS					1	3	3	5	4	5	5	1
1-HIGH					24	47	62	89	33	29	30	10
2-HIGH						24	44	61	33	25	20	
MO.AVG					24	28	43	57	25	21	17	10

PLOT. . . . . . . .CONCENTRATION VERSUS TIME

METHOD . . . . . .HI VOL

UNITS . . . . . . .MICROGRAMS/CUBIC METER

STANDARDS . . .(FEDERAL) ANNUAL - 75 UG/CU.M

PARAMETER . . TOTAL SUSPENDED PARTICULATES

AREA. . . . . . .0480, FLATHEAD COUNTY

SITE. . . . . . .035, POLEBRIDGE

CITY. . . . . . .POLEBRIDGE

MONTANA STATE AIR QUALITY BUREAU

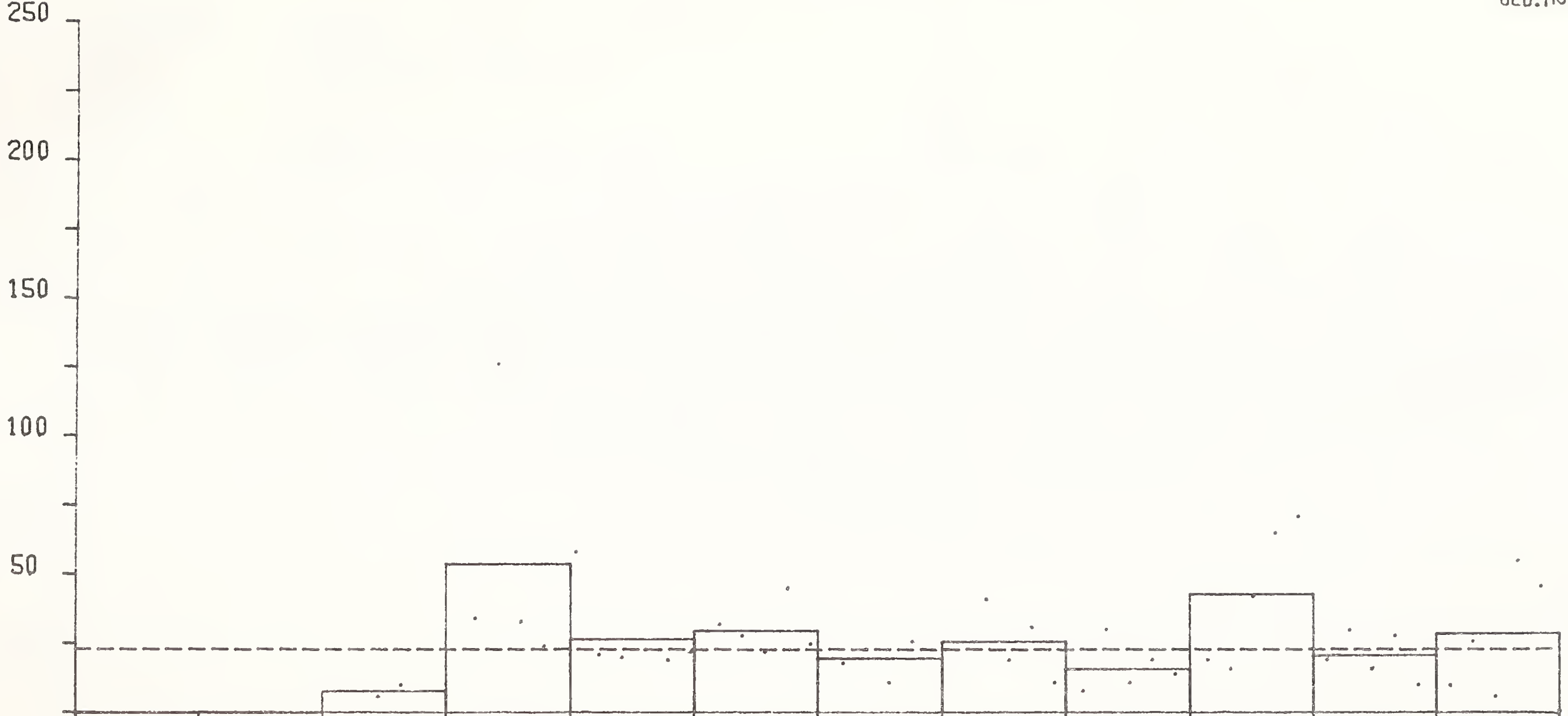
MAY 18, 1982

TECHNICAL SERVICES

Figure 2-B

1977

GEO.AVG = 23



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
NUM-OBS			2	4	6	5	4	4	5	5	5	5
1-HIGH			10	126	58	45	26	41	30	71	30	55
2-HIGH			6	34	23	32	23	31	19	65	28	46
MO.AVG			8	54	27	30	20	26	16	43	21	29

PLOT. . . . . . . .CONCENTRATION VERSUS TIME
METHOD . . . . . .HI VOL
UNITS . . . . . . .MICROGRAMS/CUBIC METER
STANDARDS . . .(FEDERAL) ANNUAL - 75 UG/CU.M

PARAMETER . . TOTAL SUSPENDED PARTICULATES
AREA. . . . . . .0480, FLATHEAD COUNTY
SITE. . . . . . .029, NAAC TRAILER
CITY. . . . . . .COLUMBIA FALLS

MONTANA STATE AIR QUALITY BUREAU

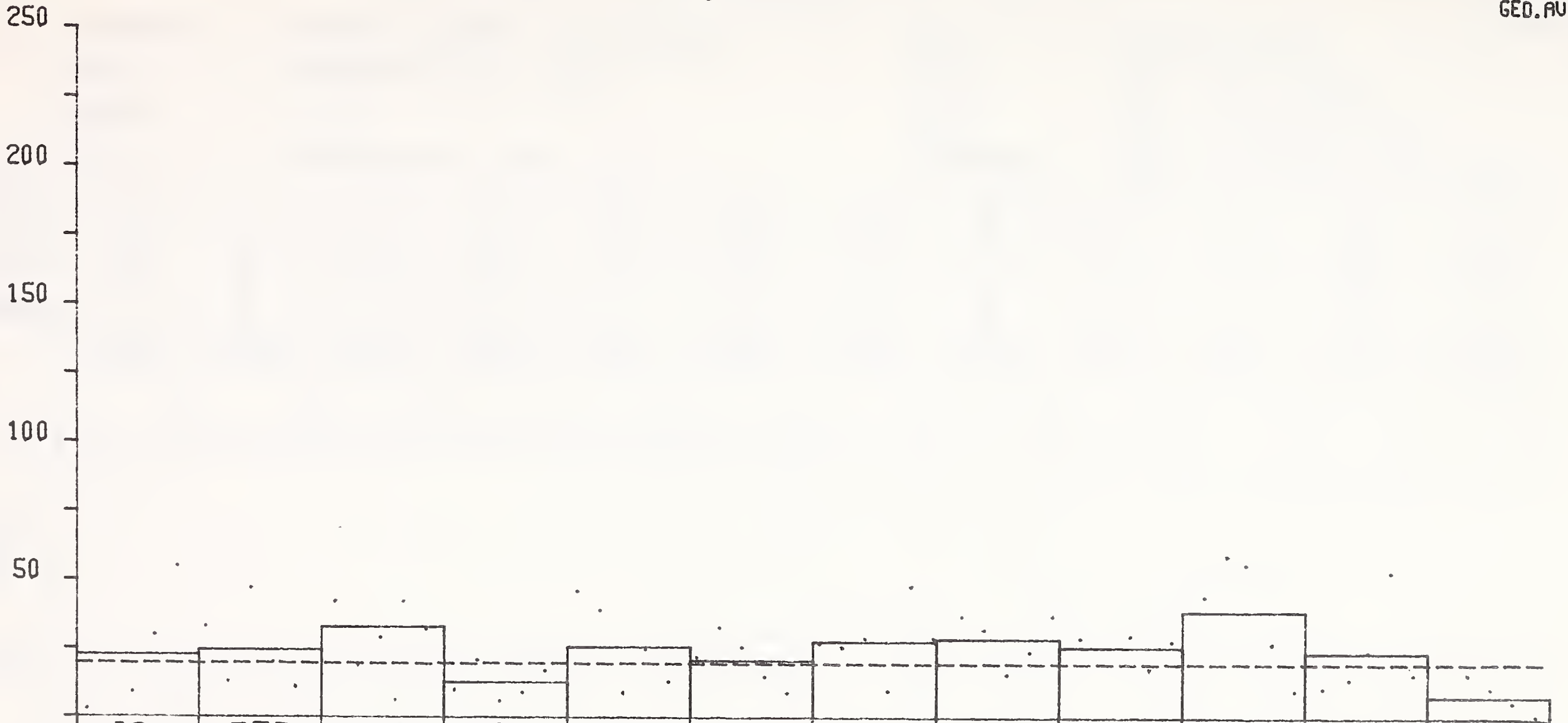
MAY 18, 1982

TECHNICAL SERVICES

Figure 2-C

1978

GEO.AVG = 20



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
NUM-OBS	5	5	5	5	5	5	6	5	4	5	5	5
1-HIGH	55	47	42	21	46	33	48	37	30	59	53	16
2-HIGH	30	33	42	17	39	26	29	37	29	56	24	11
MO.AVG	23	25	33	13	26	21	28	29	26	39	24	8

PLOT. . . . . . . CONCENTRATION VERSUS TIME
METHOD . . . . . HI VOL
UNITS . . . . . . MICROGRAMS/CUBIC METER
STANDARDS . . . (FEDERAL) ANNUAL - 75 UG/CU.M

PARAMETER . . TOTAL SUSPENDED PARTICULATES
AREA. . . . . . .0480, FLATHEAD COUNTY
SITE. . . . . . .029, NAAC TRAILER
CITY. . . . . . .COLUMBIA FALLS

MONTANA STATE AIR QUALITY BUREAU

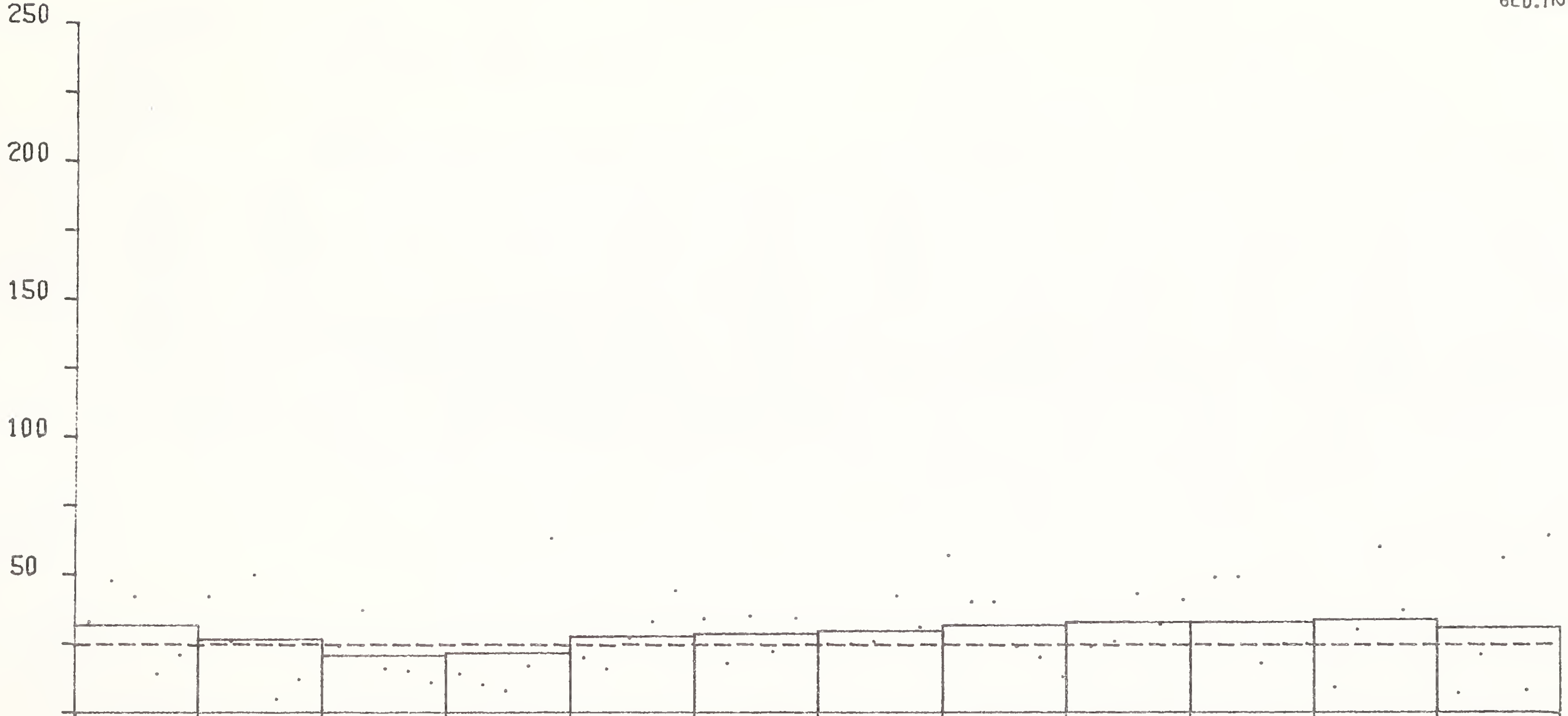
MAY 18, 1982

TECHNICAL SERVICES

Figure 2-D

1979

GEO.AVG = 25



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
NUM-OBS	5	5	5	5	5	5	5	6	5	5	4	5
1-HIGH	48	50	37	63	44	35	42	57	43	49	60	64
2-HIGH	42	42	24	17	33	34	31	40	41	49	37	56
MO.AVG	32	27	21	22	28	29	30	32	33	33	34	31

PLOT. . . . . . . .CONCENTRATION VERSUS TIME
METHOD . . . . .HI VOL
UNITS . . . . . . .MICROGRAMS/CUBIC METER
STANDARDS . . .(FEDERAL) ANNUAL - 75 UG/CU.M

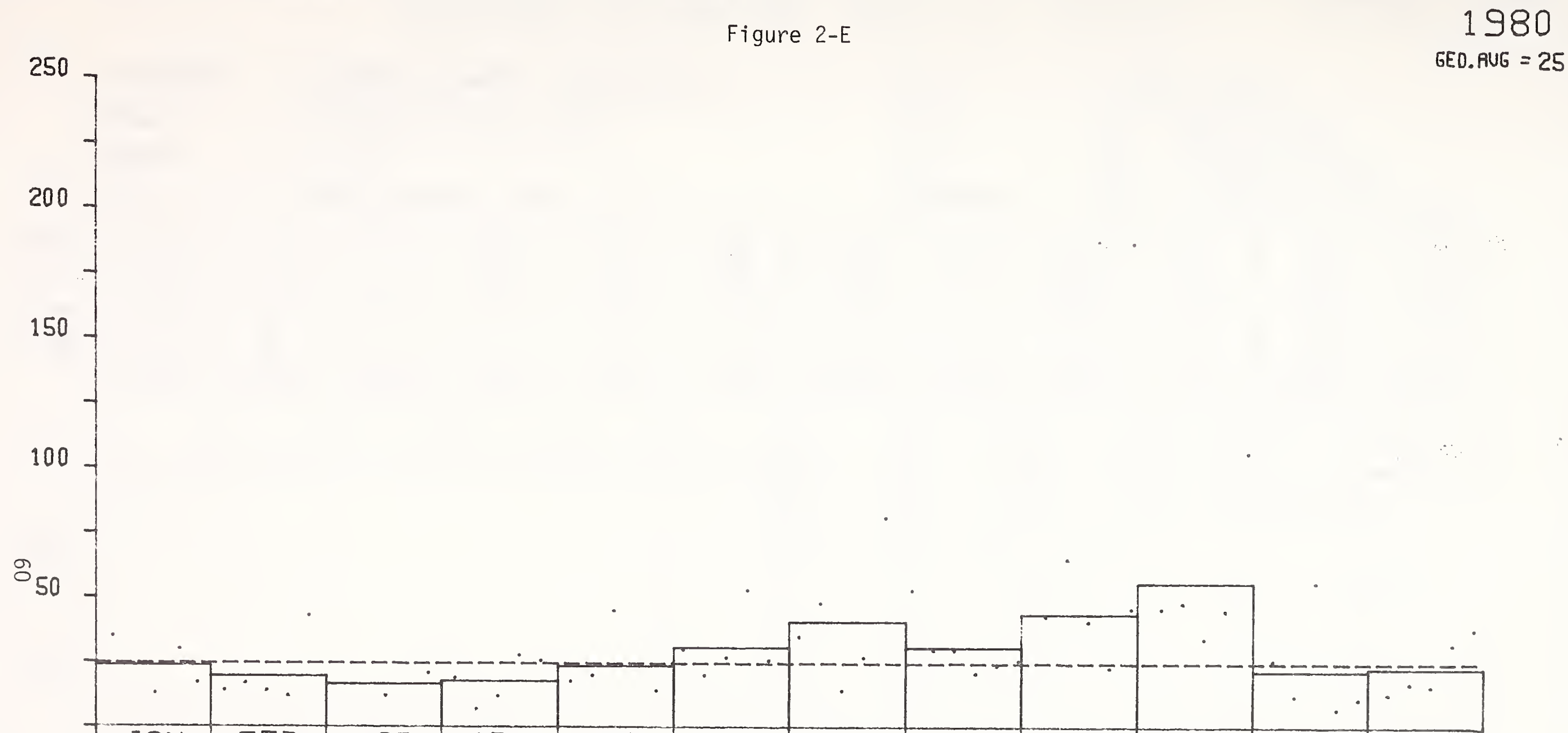
PARAMETER . . TOTAL SUSPENDED PARTICULATES
AREA. . . . . . .0480, FLATHEAD COUNTY
SITE. . . . . . .029, NAAC TRAILER
CITY. . . . . . .COLUMBIA FALLS

MONTANA STATE AIR QUALITY BUREAU.

MAY 18, 1982

TECHNICAL SERVICES

Figure 2-E



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
NUM-OBS	5	5	2	5	4	5	5	6	5	5	5	5
1-HIGH	35	43	21	28	45	53	81	53	65	106	56	38
2-HIGH	30	17	12	26	20	30	48	30	46	48	26	32
MO.AVG	24	20	17	18	24	31	41	31	44	56	22	23

PLOT. . . . . . . .CONCENTRATION VERSUS TIME
METHOD . . . . . .HI VOL
UNITS . . . . . . .MICROGRAMS/CUBIC METER
STANDARDS . . .(FEDERAL) ANNUAL - 75 UG/CU.M

PARAMETER . . TOTAL SUSPENDED PARTICULATES
AREA. . . . . . .0480, FLATHEAD COUNTY
SITE. . . . . . . .029, NAAC TRAILER
CITY. . . . . . .COLUMBIA FALLS

MONTANA STATE AIR QUALITY BUREAU

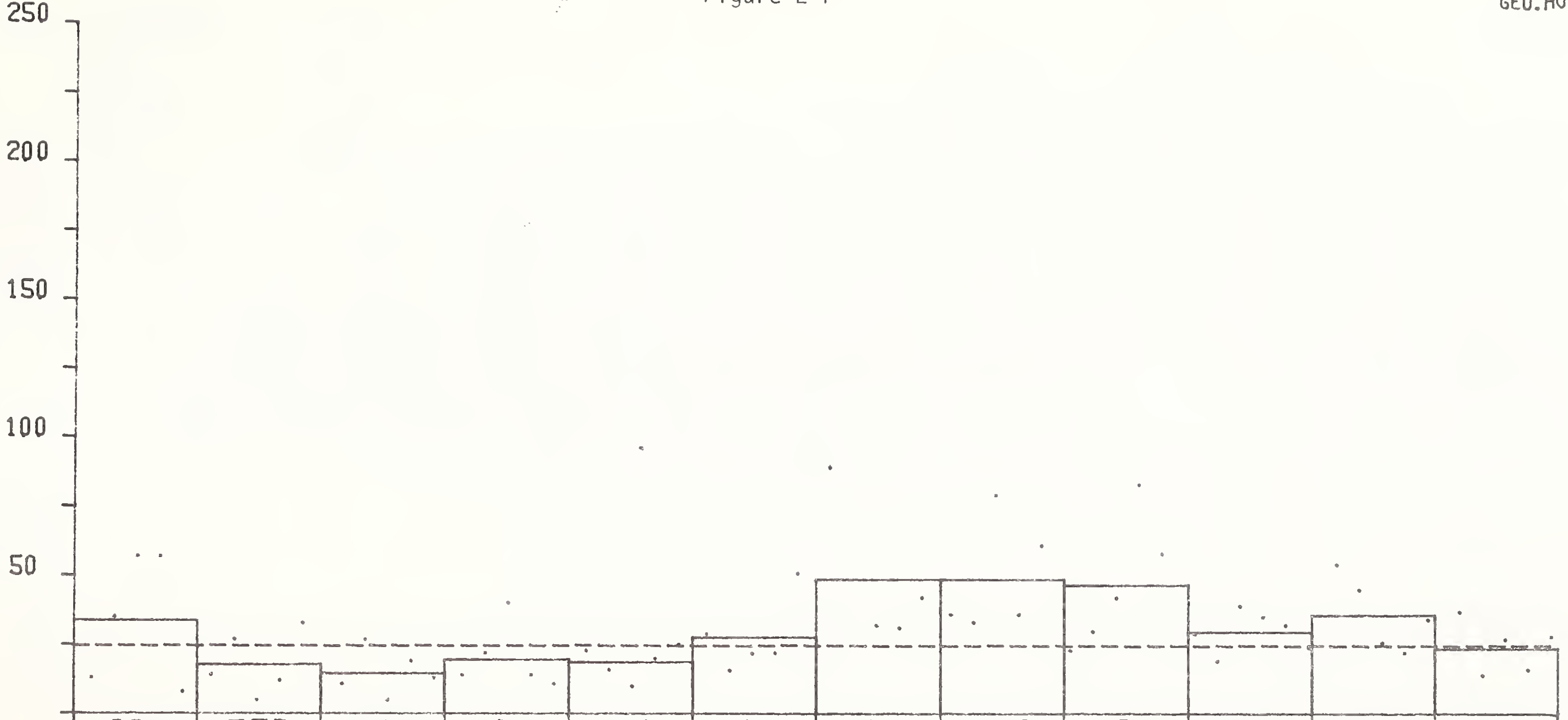
MAY 18, 1982

TECHNICAL SERVICES

Figure 2-F

1981

GEO.AVG = 25



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
NUM-OBS	5	5	5	5	5	5	4	5	5	6	5	5
1-HIGH	57	33	27	40	25	51	89	79	83	39	54	37
2-HIGH	57	27	19	22	23	29	42	61	58	35	45	28
MO.AVG	34	18	15	20	19	28	49	49	47	30	36	24

PLOT. . . . . . . .CONCENTRATION VERSUS TIME

METHOD . . . . .HI VOL

UNITS . . . . . .MICROGRAMS/CUBIC METER

STANDARDS . . .(FEDERAL) ANNUAL - 75 UG/CU.M

PARAMETER . . TOTAL SUSPENDED PARTICULATES

AREA. . . . . . .0480, FLATHEAD COUNTY

SITE. . . . . . .029, NAAC TRAILER

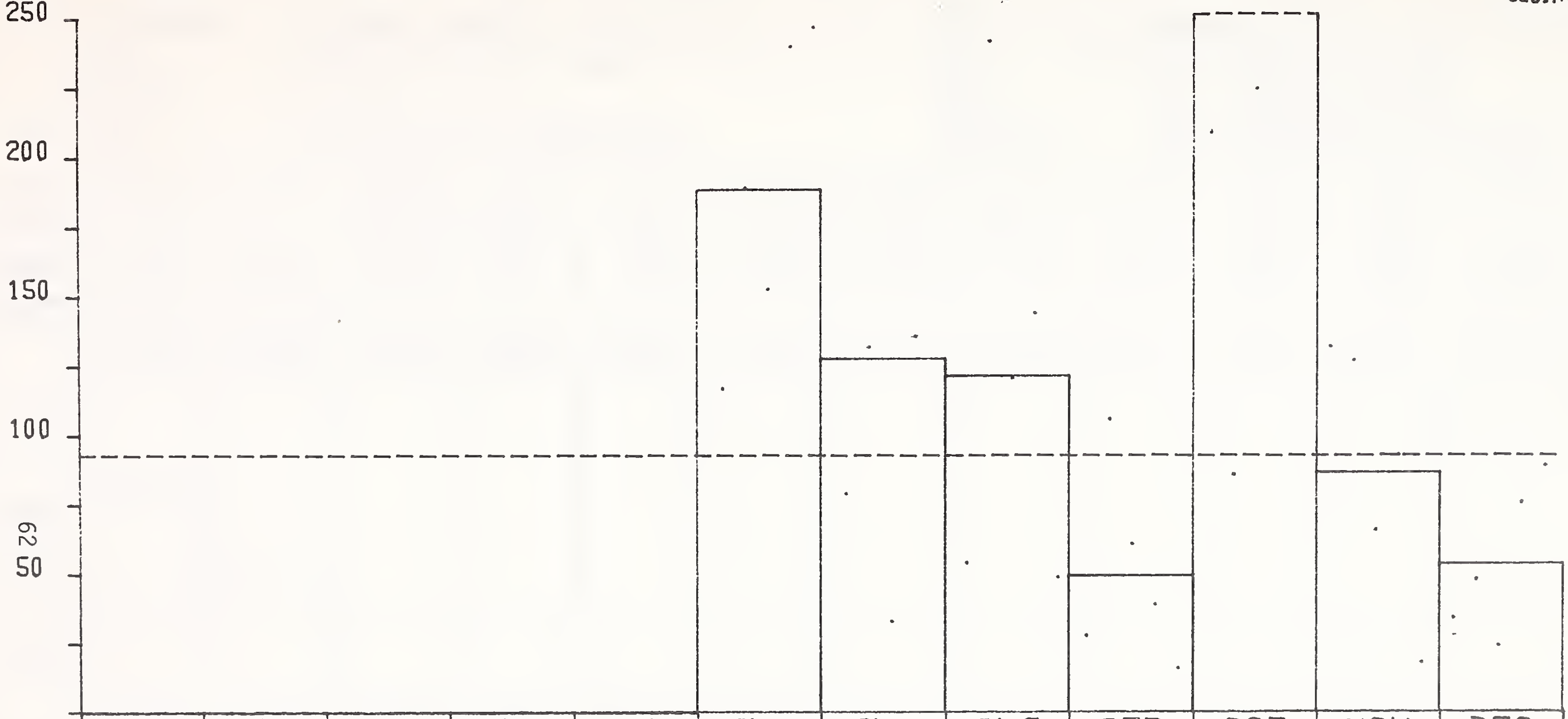
CITY. . . . . . .COLUMBIA FALLS

MONTANA STATE AIR QUALITY BUREAU

MAY 18, 1982

TECHNICAL SERVICES

Figure 2-G



1977

GEO.AVG = 93

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
NUM-OBS						5	5	5	5	5	5	5
1-HIGH						247	260	242	106	467	132	89
2-HIGH						240	136	144	61	271	127	76
MO.AVG						189	128	122	50	252	87	54

PLOT. . . . . CONCENTRATION VERSUS TIME
METHOD . . . . . HI VOL
UNITS . . . . . . .MICROGRAMS/CUBIC METER
STANDARDS . . .(FEDERAL) ANNUAL - 75 UG/CU.M

PARAMETER . . TOTAL SUSPENDED PARTICULATES
AREA. . . . . . .0270, COLUMBIA FALLS
SITE. . . . . . .005, ANDERS RESIDENCE
CITY. . . . . . .COLUMBIA FALLS

MONTANA STATE AIR QUALITY BUREAU

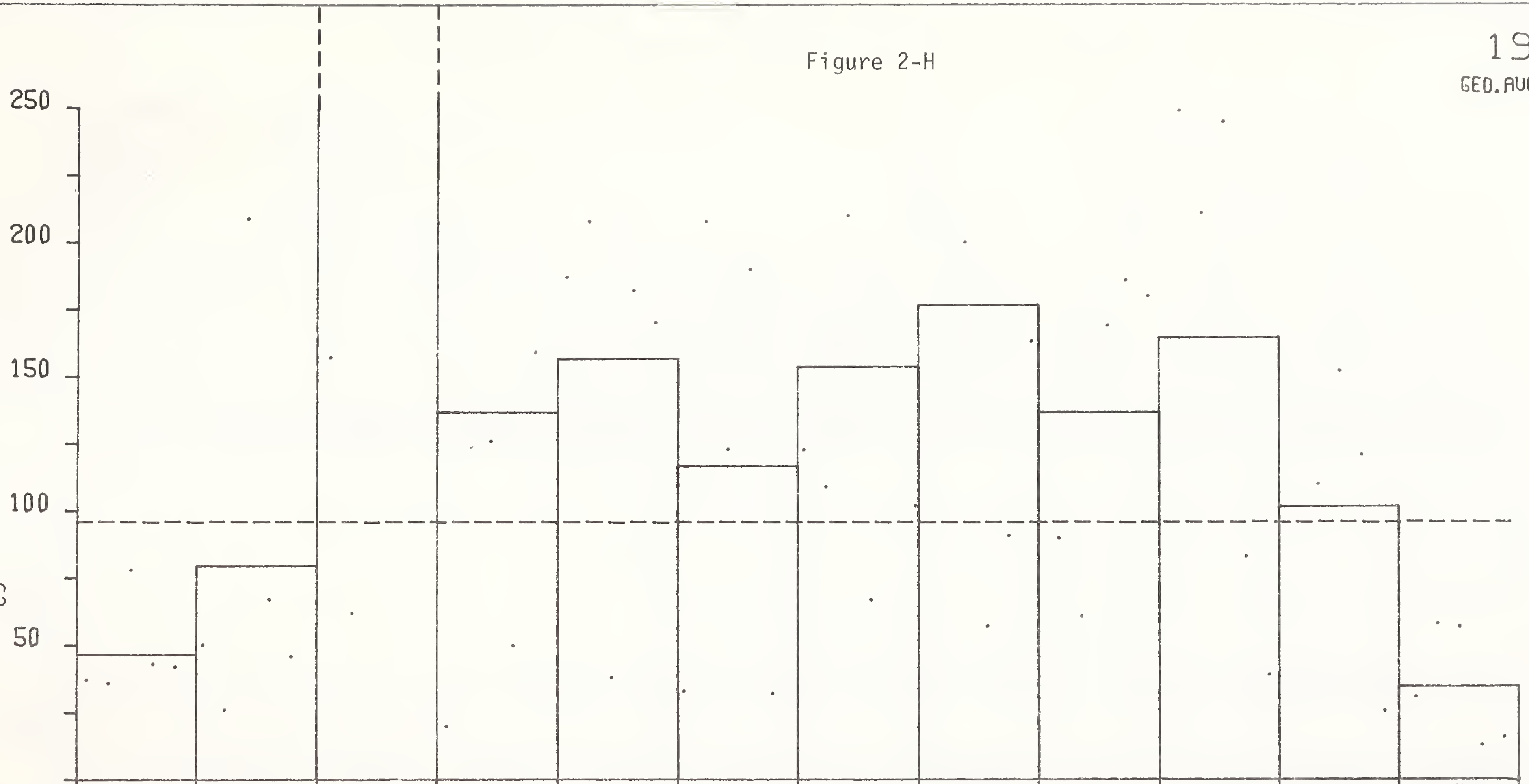
MAY 18, 1982

TECHNICAL SERVICES

Figure 2-H

1978

GEO.AVG = 96



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
NUM-OBS	5	5	5	5	5	5	6	5	5	5	4	5
1-HIGH	78	209	426	328	208	208	311	375	186	249	152	58
2-HIGH	43	67	423	159	187	190	210	200	180	245	121	57
MO.AVG	47	80	292	137	157	117	154	177	137	165	102	35

PLOT. . . . . . . CONCENTRATION VERSUS TIME
METHOD . . . . . HI VOL
UNITS . . . . . . MICROGRAMS/CUBIC METER
STANDARDS . . . (FEDERAL) ANNUAL - 75 UG/CU.M

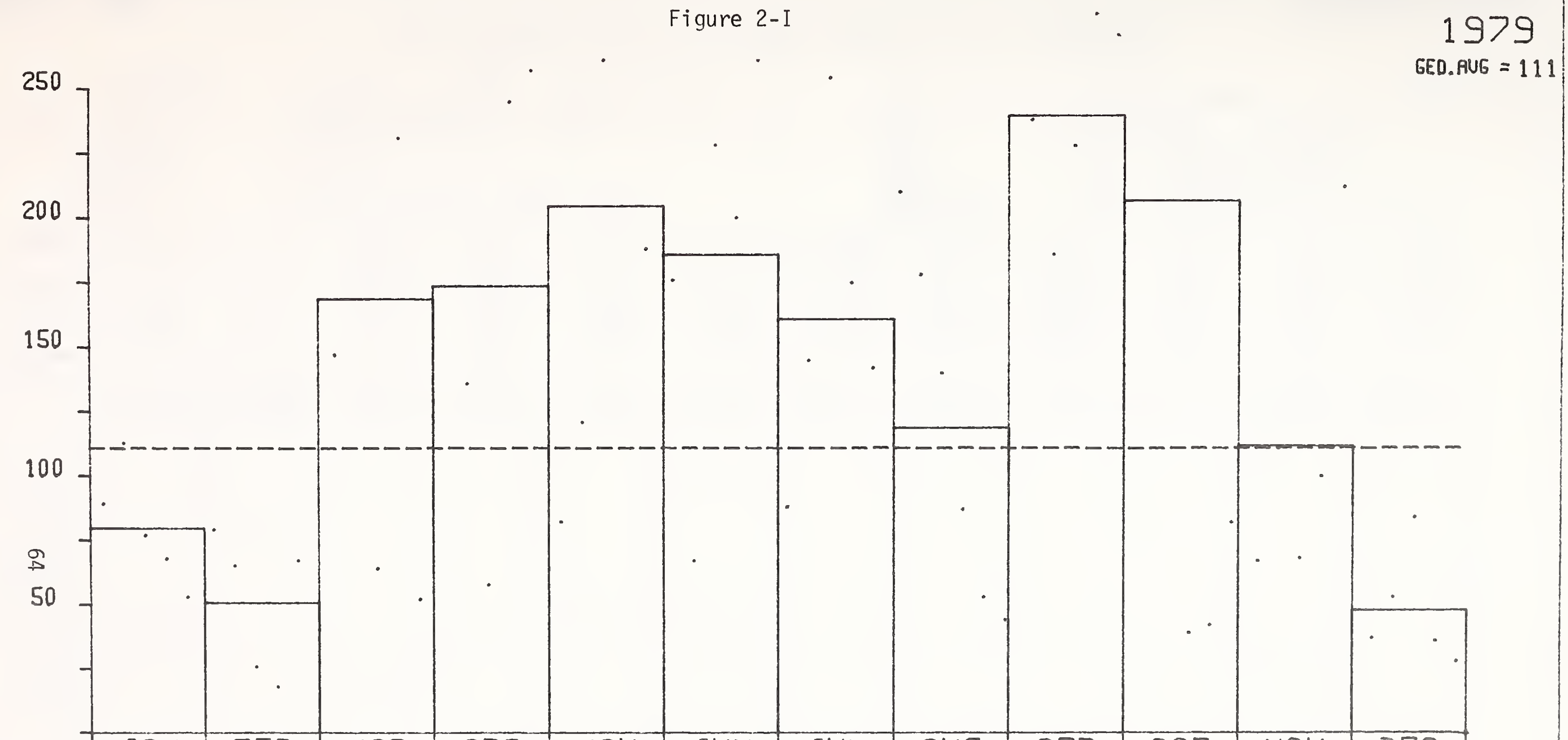
PARAMETER . . TOTAL SUSPENDED PARTICULATES
AREA. . . . . . .0270, COLUMBIA FALLS
SITE. . . . . . .005, ANDERS RESIDENCE
CITY. . . . . . .COLUMBIA FALLS

MONTANA STATE AIR QUALITY BUREAU

MAY 18, 1982

TECHNICAL SERVICES

Figure 2-I



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
NUM-OBS	5	5	5	4	5	5	5	6	5	5	5	5
1-HIGH	113	79	353	257	375	261	254	210	279	484	212	84
2-HIGH	89	67	231	245	261	228	175	178	271	390	111	53
MO.AVG	80	51	169	174	205	186	161	119	240	207	112	48

PLOT. . . . . . . .CONCENTRATION VERSUS TIME
METHOD . . . . . .HI VOL
UNITS . . . . . . .MICROGRAMS/CUBIC METER
STANDARDS . . .(FEDERAL) ANNUAL - 75 UG/CU.M

PARAMETER . . TOTAL SUSPENDED PARTICULATES
AREA. . . . . . .0270, COLUMBIA FALLS
SITE. . . . . . .005, ANDERS RESIDENCE
CITY. . . . . . .COLUMBIA FALLS

MONTANA STATE AIR QUALITY BUREAU

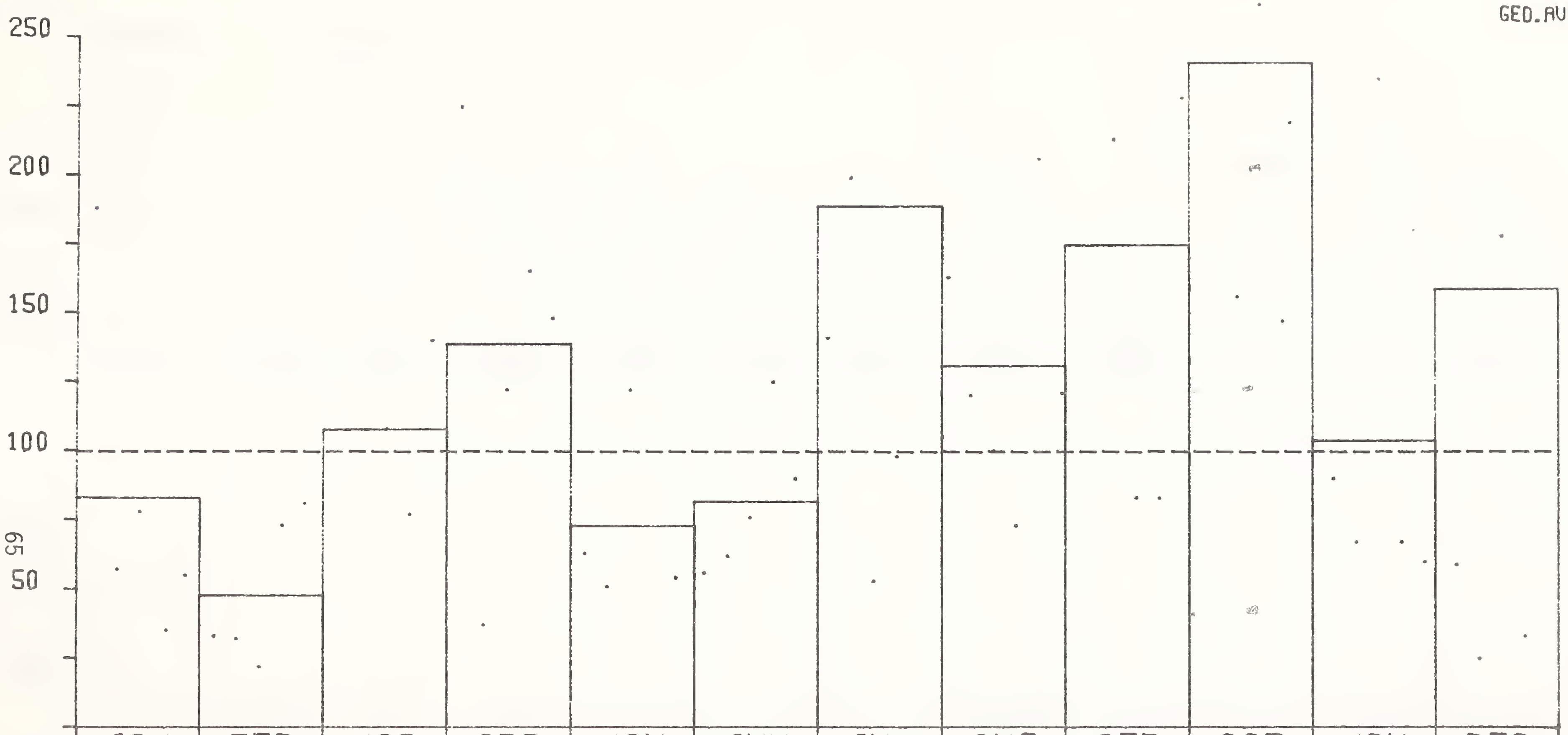
MAY 18, 1982

TECHNICAL SERVICES

Figure 2-J

1980

GEO.AVG = 100



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
NUM-OBS	5	5	3	5	4	5	5	6	5	5	5	5
1-HIGH	188	81	140	225	122	125	455	206	267	422	235	498
2-HIGH	78	73	108	165	63	90	199	163	228	262	90	178
MO.AVG	83	48	108	139	73	82	189	131	175	241	104	159

PLOT. . . . . . . CONCENTRATION VERSUS TIME
METHOD . . . . . HI VOL
UNITS . . . . . . MICROGRAMS/CUBIC METER
STANDARDS . . . (FEDERAL) ANNUAL - 75 UG/CU.M

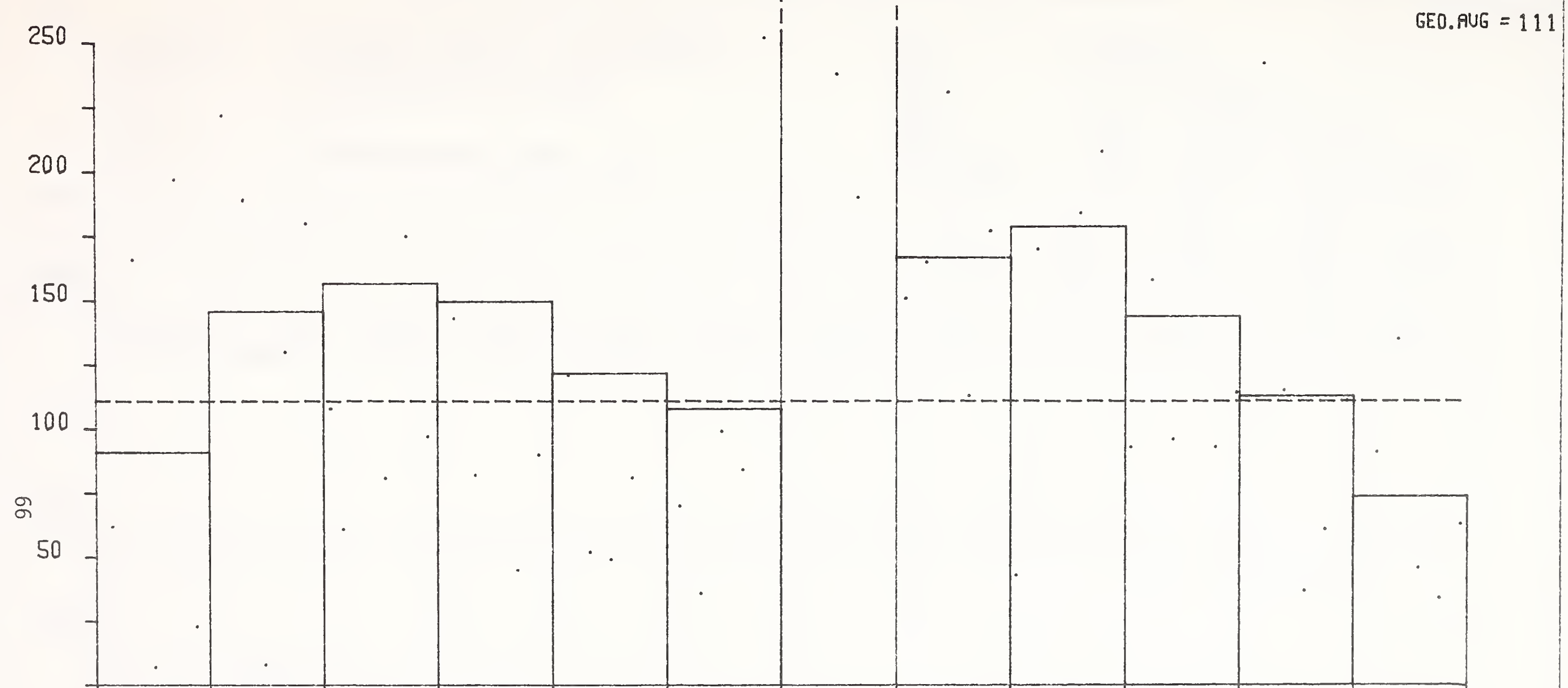
PARAMETER . . TOTAL SUSPENDED PARTICULATES
AREA. . . . . . .0270, COLUMBIA FALLS
SITE. . . . . . .005, ANDERS RESIDENCE
CITY. . . . . . .COLUMBIA FALLS

MONTANA STATE AIR QUALITY BUREAU

MAY 18, 1982

TECHNICAL SERVICES

Figure 2-K



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
NUM-OBS	5	5	5	5	5	5	5	5	5	6	5	5
1-HIGH	197	222	369	390	308	252	494	231	292	312	242	135
2-HIGH	166	189	175	143	121	99	352	177	208	158	115	91
MO.AVG	91	146	157	150	122	108	319	167	179	144	113	74

PLOT. . . . . . . CONCENTRATION VERSUS TIME
METHOD . . . . . HI VOL
UNITS . . . . . . MICROGRAMS/CUBIC METER
STANDARDS . . . (FEDERAL) ANNUAL - 75 UG/CU.M

PARAMETER . . TOTAL SUSPENDED PARTICULATES
AREA. . . . . . .0270, COLUMBIA FALLS
SITE. . . . . . .005, ANDERS RESIDENCE
CITY. . . . . . .COLUMBIA FALLS

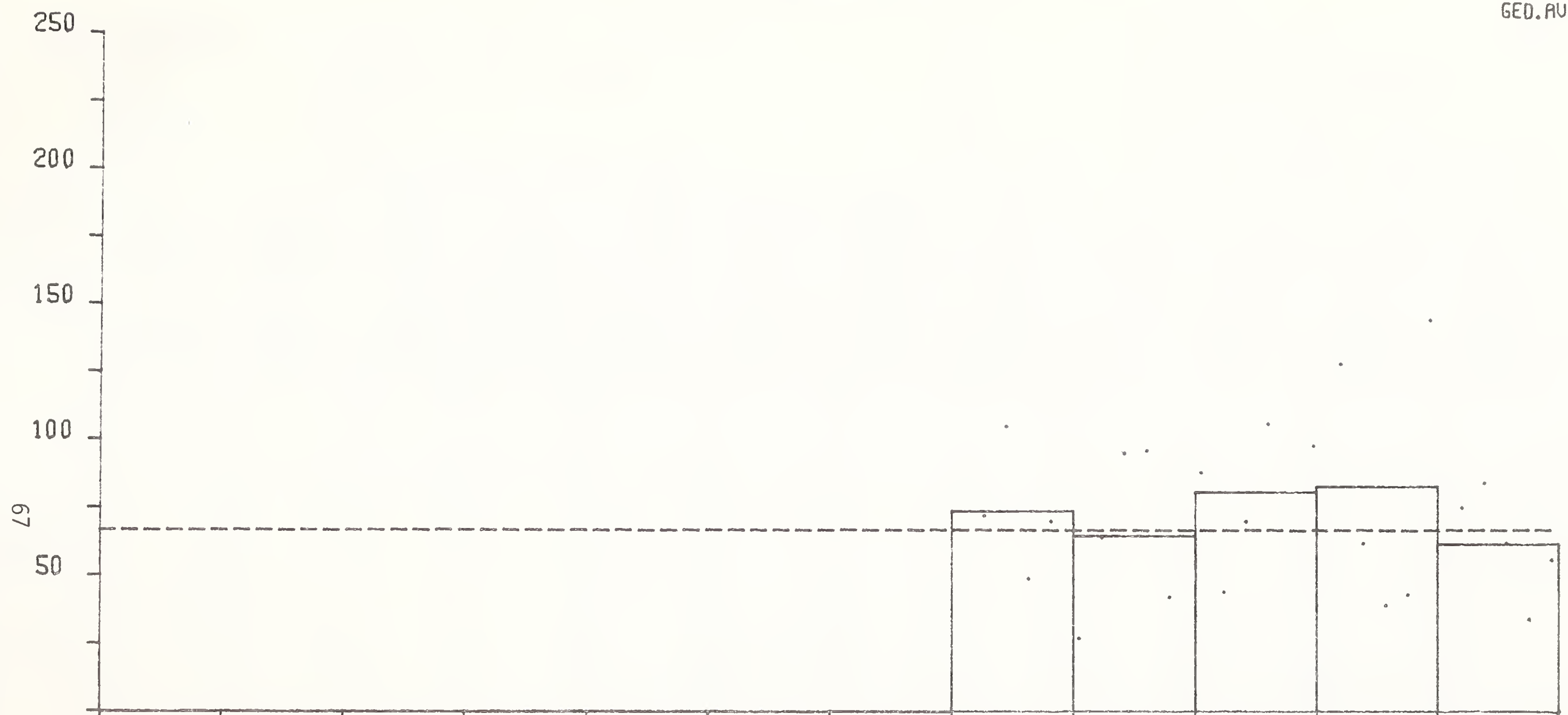
MONTANA STATE AIR QUALITY BUREAU

MAY 18, 1982

TECHNICAL SERVICES

Figure 2-L

1981
GED.AVG = 67



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
NUM-OBS								4	5	5	5	5
1-HIGH								105	96	106	144	84
2-HIGH								72	95	98	128	75
MO.AVG								74	65	81	83	62

PLOT. . . . . . . CONCENTRATION VERSUS TIME
METHOD . . . . . HI VOL
UNITS . . . . . . MICROGRAMS/CUBIC METER
STANDARDS . . . (FEDERAL) ANNUAL - 75 UG/CU.M

PARAMETER . . TOTAL SUSPENDED PARTICULATES
AREA. . . . . . .0480, FLATHEAD COUNTY
SITE. . . . . . .037, WHITEFISH
CITY. . . . . . WHITEFISH

MONTANA STATE AIR QUALITY BUREAU

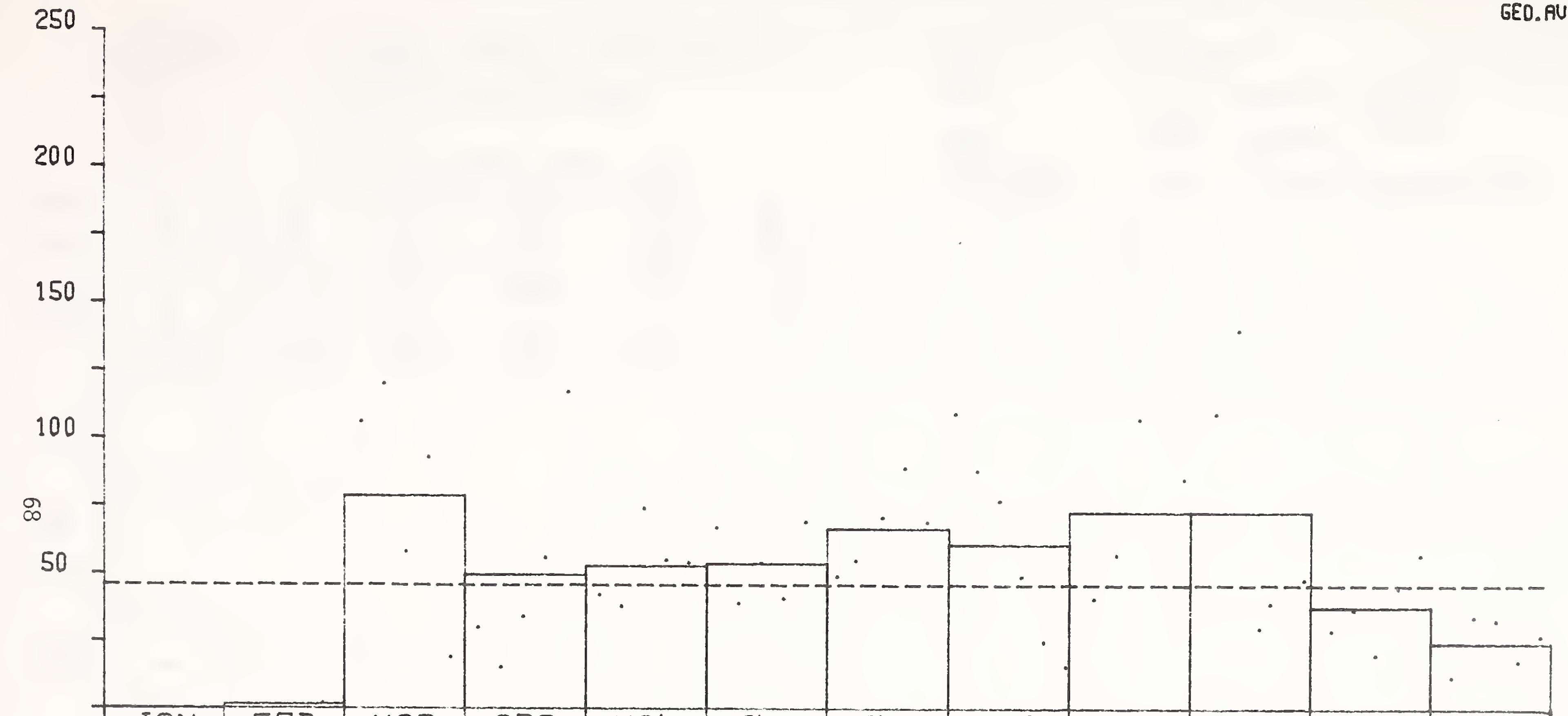
MAY 18, 1982

TECHNICAL SERVICES

Figure 2-M

1979

GEO.AVG = 46



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
NUM-OBS		1	5	5	5	5	5	6	4	5	5	5
1-HIGH		2	120	117	74	69	89	109	107	140	57	34
2-HIGH			106	56	55	67	71	88	85	109	45	33
MO.AVG		2	79	50	53	54	67	61	73	73	38	25

PLOT. . . . . . . CONCENTRATION VERSUS TIME
METHOD . . . . . HI VOL
UNITS . . . . . . MICROGRAMS/CUBIC METER
STANDARDS . . . (FEDERAL) ANNUAL - 75 UG/CU.M

PARAMETER . . TOTAL SUSPENDED PARTICULATES
AREA. . . . . . .0480, FLATHEAD COUNTY
SITE. . . . . . .304, FLATHEAD AIRPORT
CITY. . . . . . KALISPELL

MONTANA STATE AIR QUALITY BUREAU

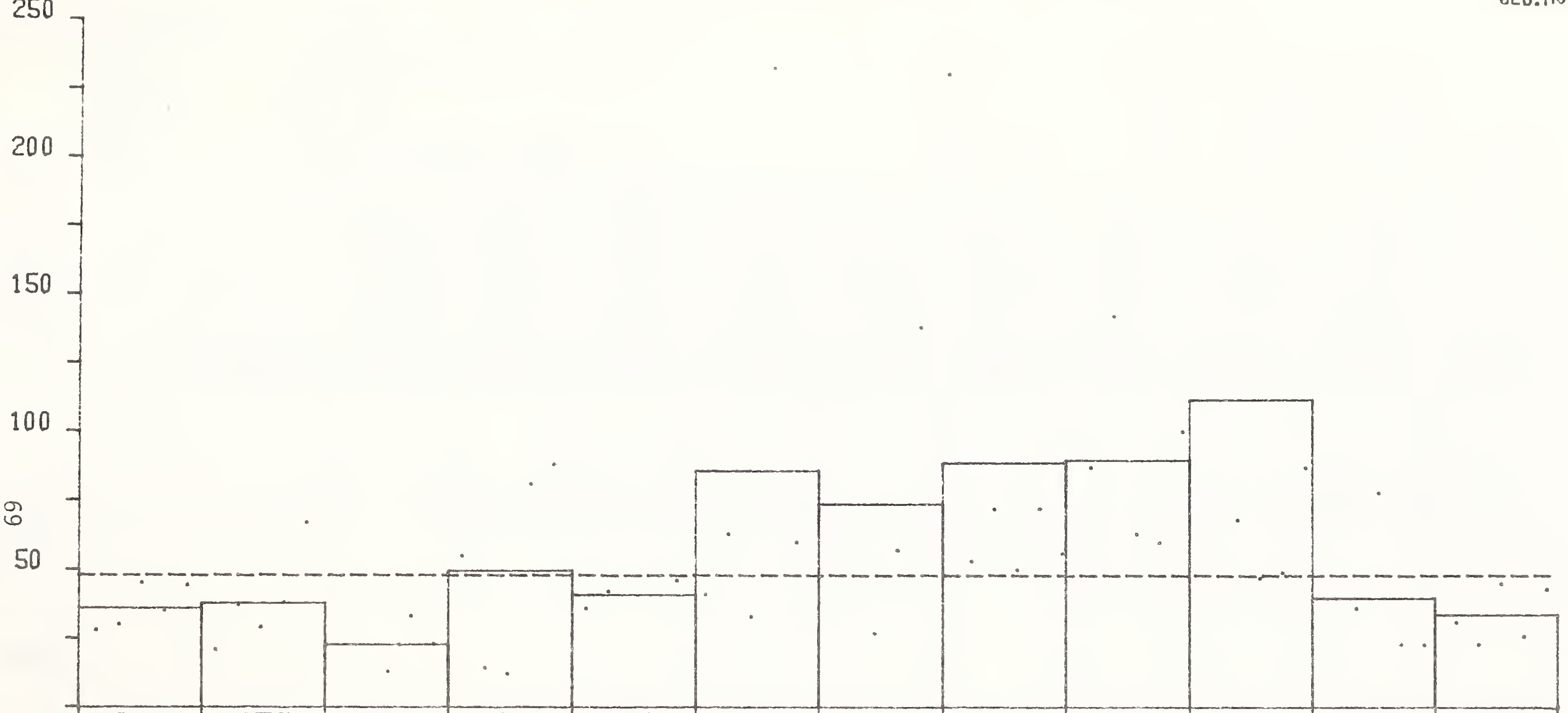
MAY 18, 1982

TECHNICAL SERVICES

Figure 2-N

1980

GEO.AVG = 48



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
NUM-OBS	5	5	3	5	3	5	3	6	5	5	4	5
1-HIGH	45	67	33	88	46	232	138	230	142	309	78	45
2-HIGH	44	38	23	81	42	63	57	72	100	87	36	43
MO.AVG	36	38	23	50	41	86	74	89	90	112	40	34

PLOT. . . . . . . CONCENTRATION VERSUS TIME
METHOD . . . . . HI VOL
UNITS . . . . . . MICROGRAMS/CUBIC METER
STANDARDS . . . (FEDERAL) ANNUAL - 75 UG/CU.M

PARAMETER . . TOTAL SUSPENDED PARTICULATES
AREA. . . . . . 0480, FLATHEAD COUNTY
SITE. . . . . . 304, FLATHEAD AIRPORT
CITY. . . . . . KALISPELL

MONTANA STATE AIR QUALITY BUREAU

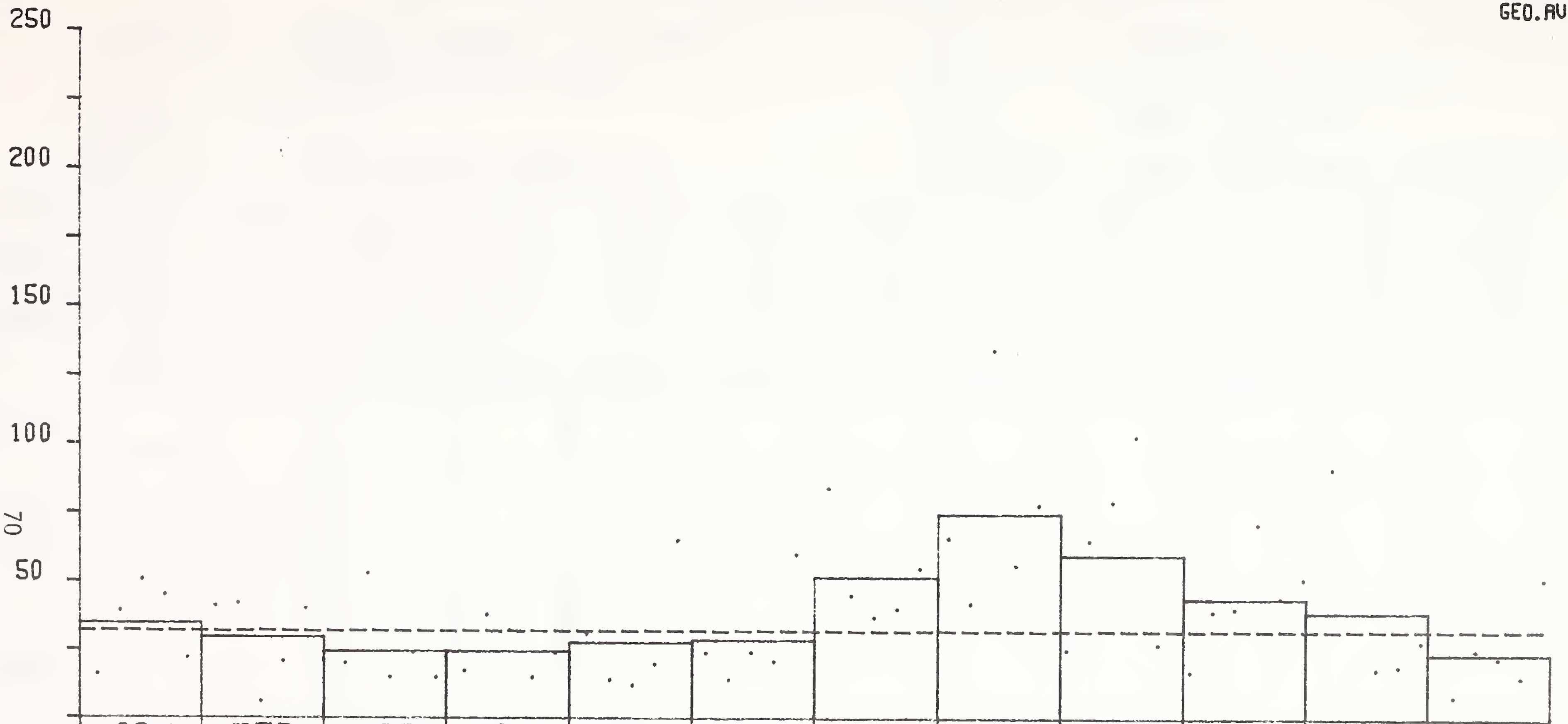
MAY 18, 1982

TECHNICAL SERVICES

Figure 2-0

1981

GEO.AVG = 32



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
NUM-OBS	5	5	5	5	5	5	5	5	5	6	4	5
1-HIGH	51	42	53	38	65	60	84	134	103	71	91	51
2-HIGH	45	41	24	32	31	24	55	78	79	51	28	25
MO.AVG	35	30	25	25	28	29	52	75	60	44	39	24

PLOT. . . . . . . .CONCENTRATION VERSUS TIME
METHOD . . . . . .HI VOL
UNITS . . . . . . .MICROGRAMS/CUBIC METER
STANDARDS . . .(FEDERAL) ANNUAL - 75 UG/CU.M

PARAMETER . . TOTAL SUSPENDED PARTICULATES
AREA. . . . . . . 0480, FLATHEAD COUNTY
SITE. . . . . . . 304, FLATHEAD AIRPORT
CITY. . . . . . . KALISPELL

MONTANA STATE AIR QUALITY BUREAU

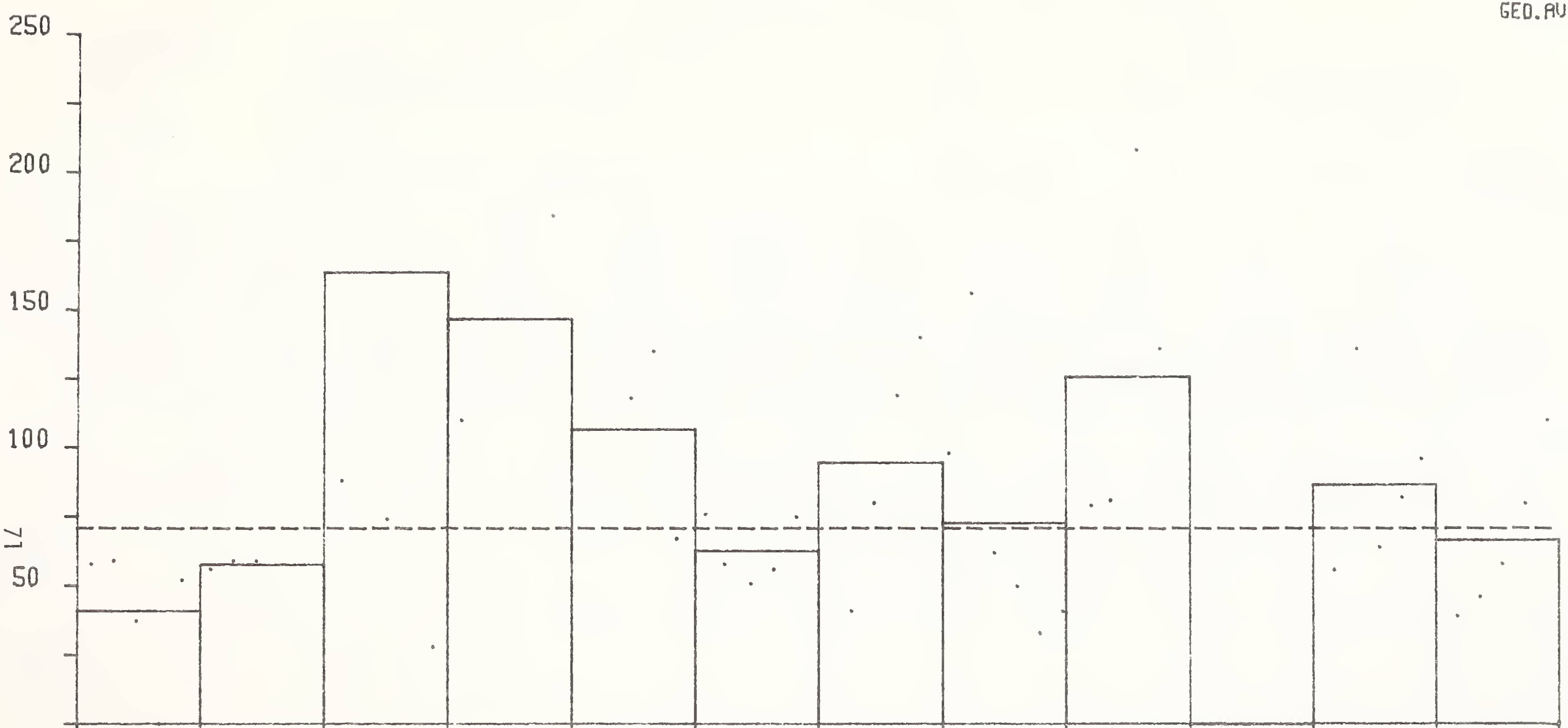
MAY 18, 1982

TECHNICAL SERVICES

Figure 2-P

1979

GEO.AVG = 71



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
NUM-OBS	5	3	5	2	3	5	4	6	4		5	5
1-HIGH	59	59	343	184	135	76	140	156	208		136	110
2-HIGH	58	59	289	110	118	75	119	98	136		96	80
MO.AVG	41	58	164	147	107	63	95	73	126		87	67

PLOT . . . . CONCENTRATION VERSUS TIME
METHOD . . . . . HI VOL
UNITS . . . . . . MICROGRAMS/CUBIC METER
STANDARDS . . . (FEDERAL) ANNUAL - 75 UG/CU.M

PARAMETER . . TOTAL SUSPENDED PARTICULATES
AREA. . . . . . 0800, KALISPELL
SITE. . . . . . 014, STROM RESIDENCE
CITY. . . . . . KALISPELL

MONTANA STATE AIR QUALITY BUREAU

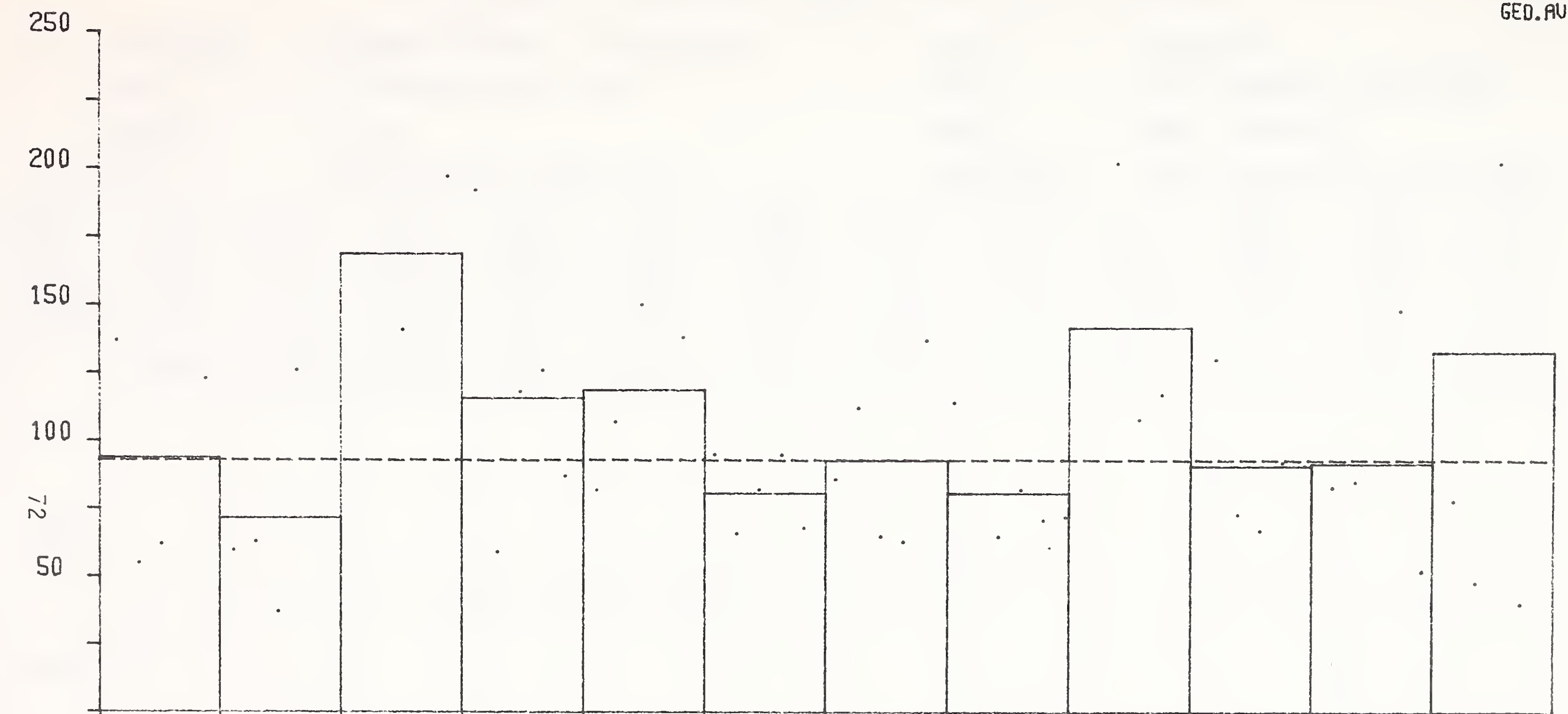
MAY 18, 1982

TECHNICAL SERVICES

Figure 2-Q

1980

GEO.AVG = 93



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
NUM-OBS	4	4	2	5	4	5	5	5	3	5	4	5
1-HIGH	137	126	197	192	150	95	137	114	202	130	148	296
2-HIGH	123	63	141	126	138	95	112	82	117	92	85	202
MO.AVG	94	72	169	116	119	81	93	81	142	91	92	133

PLOT. . . . . . . CONCENTRATION VERSUS TIME
METHOD . . . . . HI VOL
UNITS . . . . . . MICROGRAMS/CUBIC METER
STANDARDS . . . (FEDERAL) ANNUAL - 75 UG/CU.M

PARAMETER . . TOTAL SUSPENDED PARTICULATES
AREA. . . . . . .0800, KALISPELL
SITE. . . . . . .015, UNIVERSAL ATHLETICS
CITY. . . . . . KALISPELL

MONTANA STATE AIR QUALITY BUREAU

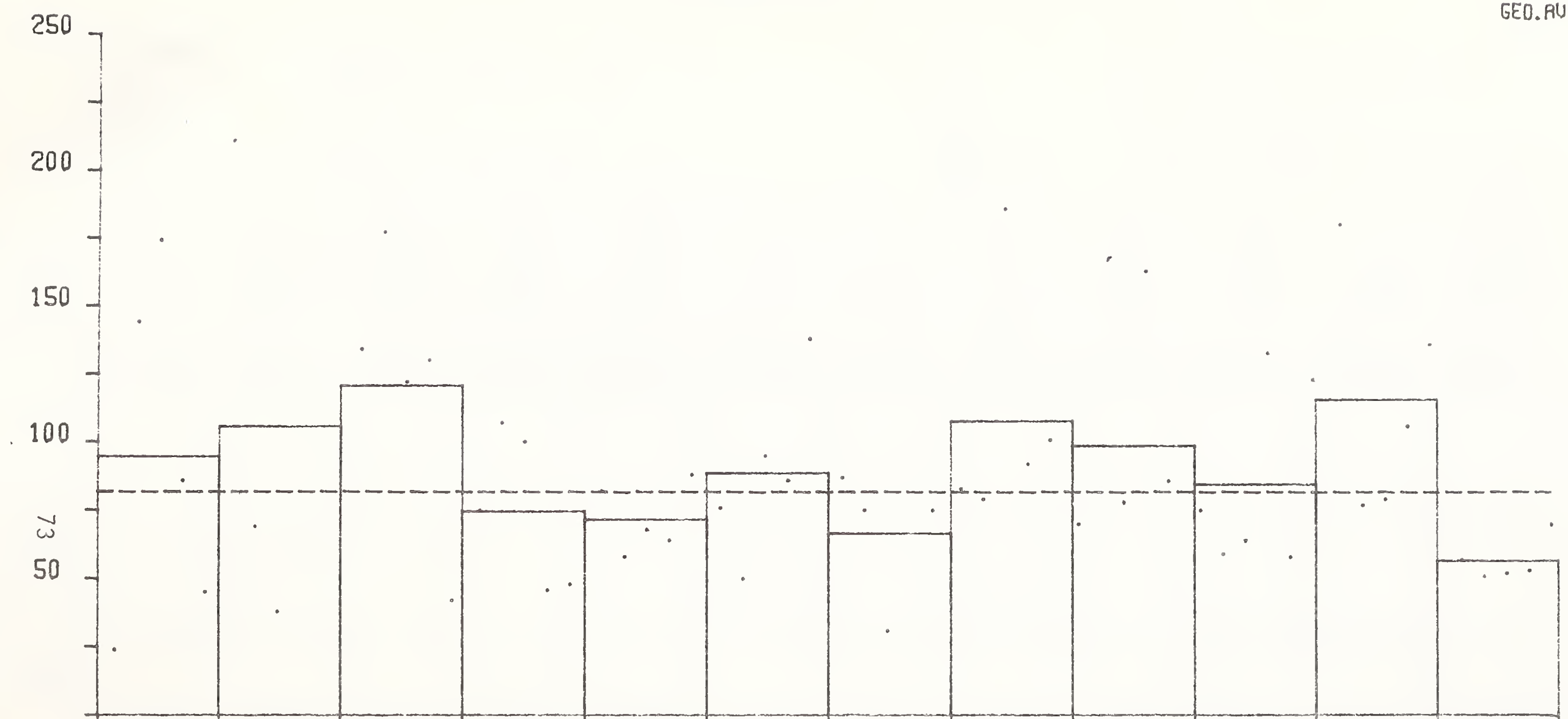
MAY 20, 1982

TECHNICAL SERVICES

Figure 2-R

1981

GEO.AVG = 82



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
NUM-OBS	5	3	5	5	5	5	4	5	4	6	5	5
1-HIGH	174	211	177	107	88	138	87	186	163	133	180	70
2-HIGH	144	69	134	100	82	95	75	101	86	123	136	57
MO.AVG	95	106	121	75	72	89	67	108	99	85	116	57

PLOT. . . . . . .CONCENTRATION VERSUS TIME
METHOD . . . . .HI VOL
UNITS . . . . . .MICROGRAMS/CUBIC METER
STANDARDS . . .(FEDERAL) ANNUAL - 75 UG/CU.M

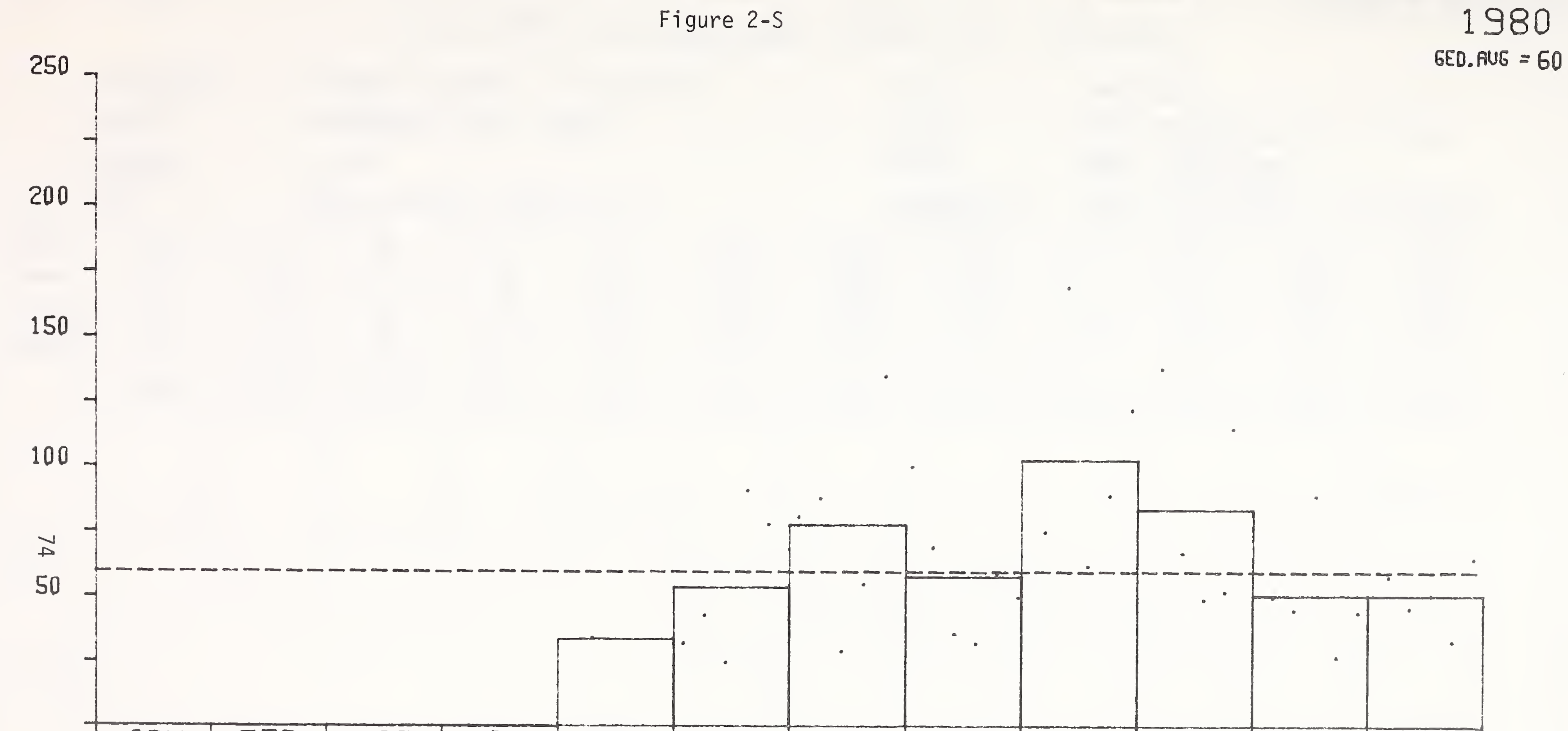
PARAMETER . .TOTAL SUSPENDED PARTICULATES
AREA. . . . . .0800, KALISPELL
SITE. . . . . .015, UNIVERSAL ATHLETICS
CITY. . . . . .KALISPELL

MONTANA STATE AIR QUALITY BUREAU

MAY 20, 1982

TECHNICAL SERVICES

Figure 2-S



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
NUM-OBS					1	5	5	6	5	5	5	5
1-HIGH					34	91	135	100	169	138	89	65
2-HIGH						78	88	69	122	115	50	58
MO.AVG					34	54	78	58	103	84	51	51

PLOT. . . . . . . CONCENTRATION VERSUS TIME
METHOD . . . . . HI VOL
UNITS . . . . . . MICROGRAMS/CUBIC METER
STANDARDS . . . (FEDERAL) ANNUAL - 75 UG/CU.M

PARAMETER . . TOTAL SUSPENDED PARTICULATES
AREA. . . . . . .0800, KALISPELL
SITE. . . . . . .016, EVERGREEN ELEC. COOP.
CITY. . . . . . KALISPELL

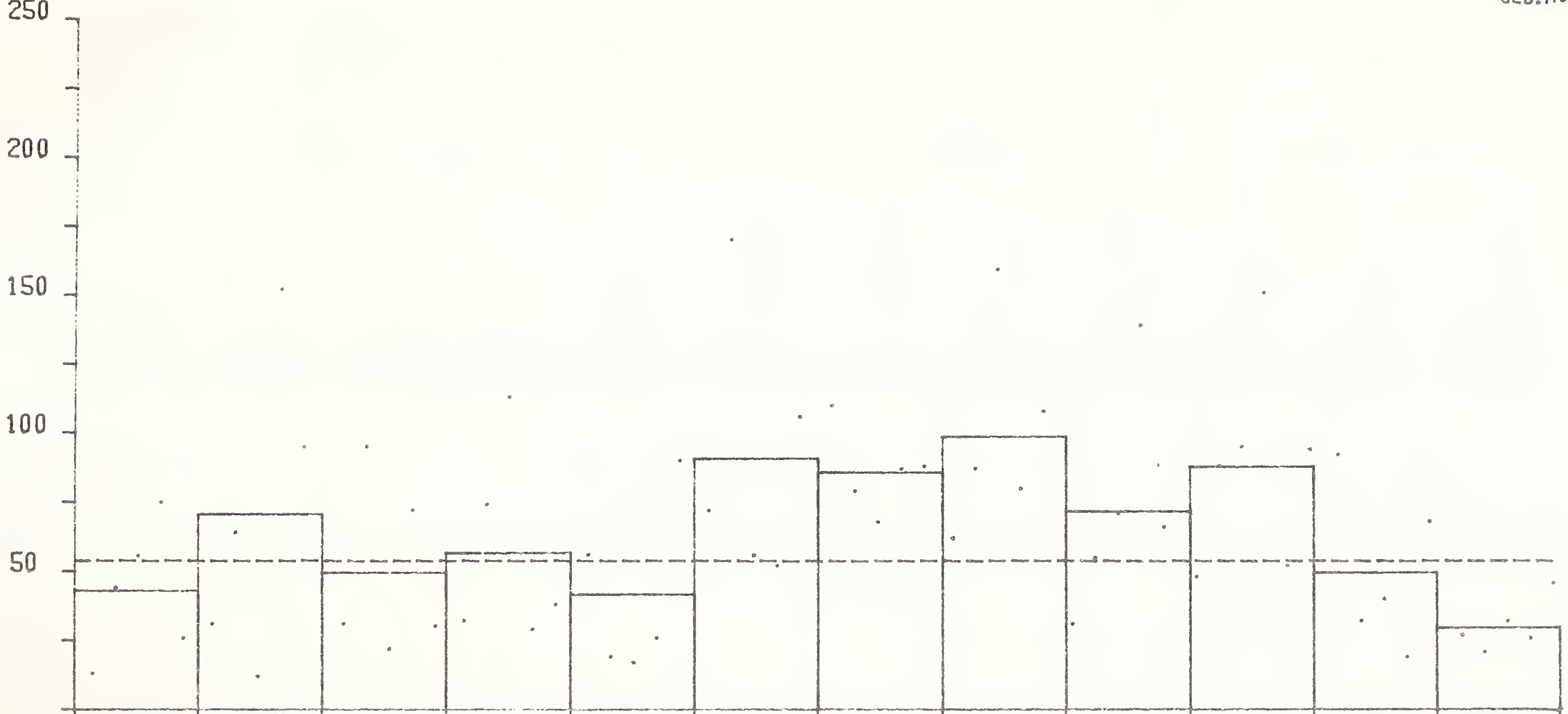
MONTANA STATE AIR QUALITY BUREAU

MAY 20, 1982

TECHNICAL SERVICES

Figure 2-T

1981
GEO.AVG = 54



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
NUM-OBS	5	5	5	5	5	5	5	5	5	6	5	5
1-HIGH	75	152	95	113	90	170	110	159	139	151	92	46
2-HIGH	56	95	72	74	56	106	88	108	71	95	68	32
MO.AVG	43	71	50	57	42	91	86	99	72	88	50	30

PLOT. . . . . . . CONCENTRATION VERSUS TIME
METHOD . . . . . HI VOL
UNITS . . . . . . MICROGRAMS/CUBIC METER
STANDARDS . . . (FEDERAL) ANNUAL - 75 UG/CU.M

PARAMETER . . TOTAL SUSPENDED PARTICULATES
AREA. . . . . . 0800, KALISPELL
SITE. . . . . . 016, EVERGREEN ELEC. COOP.
CITY. . . . . KALISPELL

MONTANA STATE AIR QUALITY BUREAU

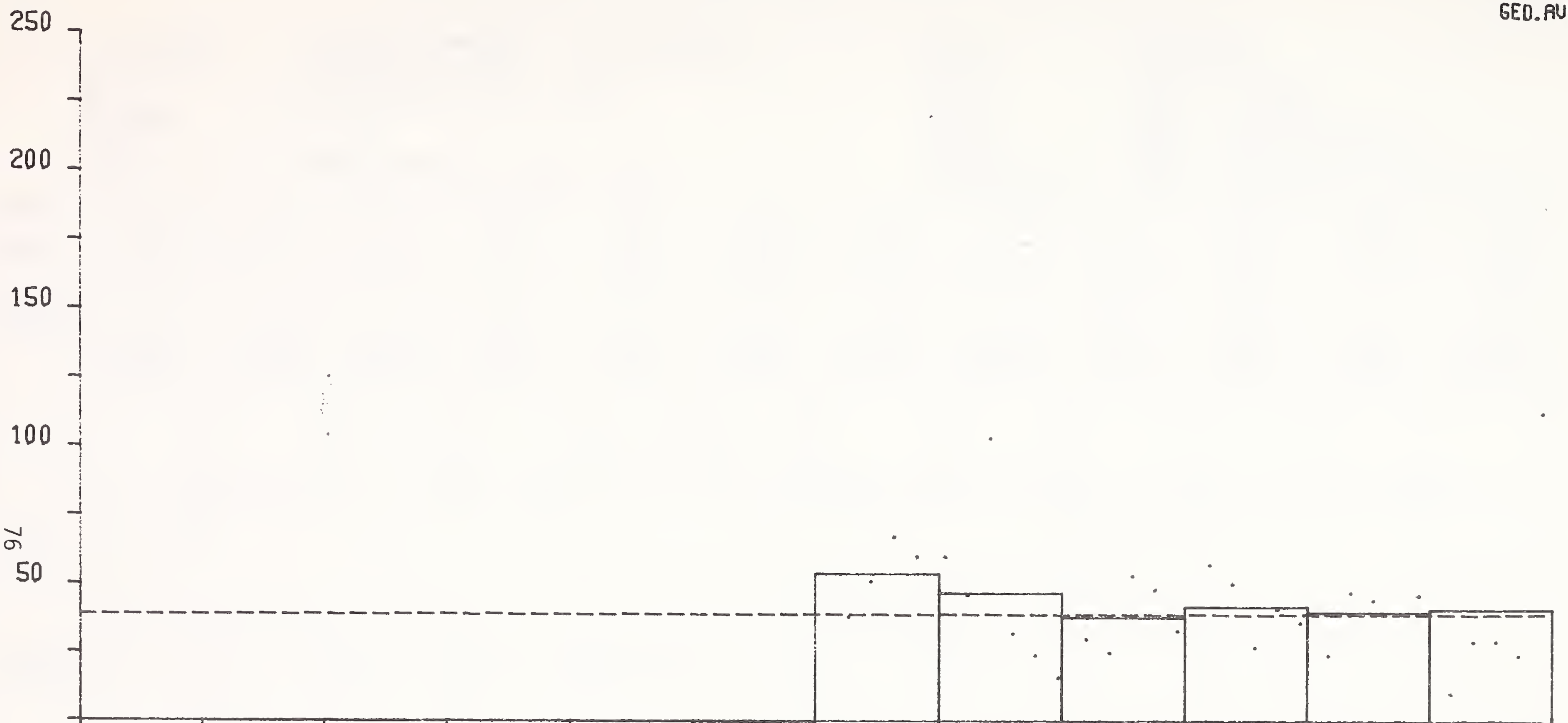
MAY 20, 1982

TECHNICAL SERVICES

Figure 2-U

1979

GEO.AVG = 39



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
NUM-OBS							4	6	5	5	5	5
1-HIGH							67	103	53	57	47	112
2-HIGH							60	60	48	50	46	29
MO.AVG							54	47	38	42	40	41

PLOT. . . . . . . .CONCENTRATION VERSUS TIME
METHOD . . . . . .HI VOL
UNITS . . . . . . .MICROGRAMS/CUBIC METER
STANDARDS . . .(FEDERAL) ANNUAL - 75 UG/CU.M

PARAMETER . .TOTAL SUSPENDED PARTICULATES
AREA. . . . . . .0480, FLATHEAD COUNTY
SITE. . . . . . .036, BIG FORK
CITY. . . . . . .BIG FORK

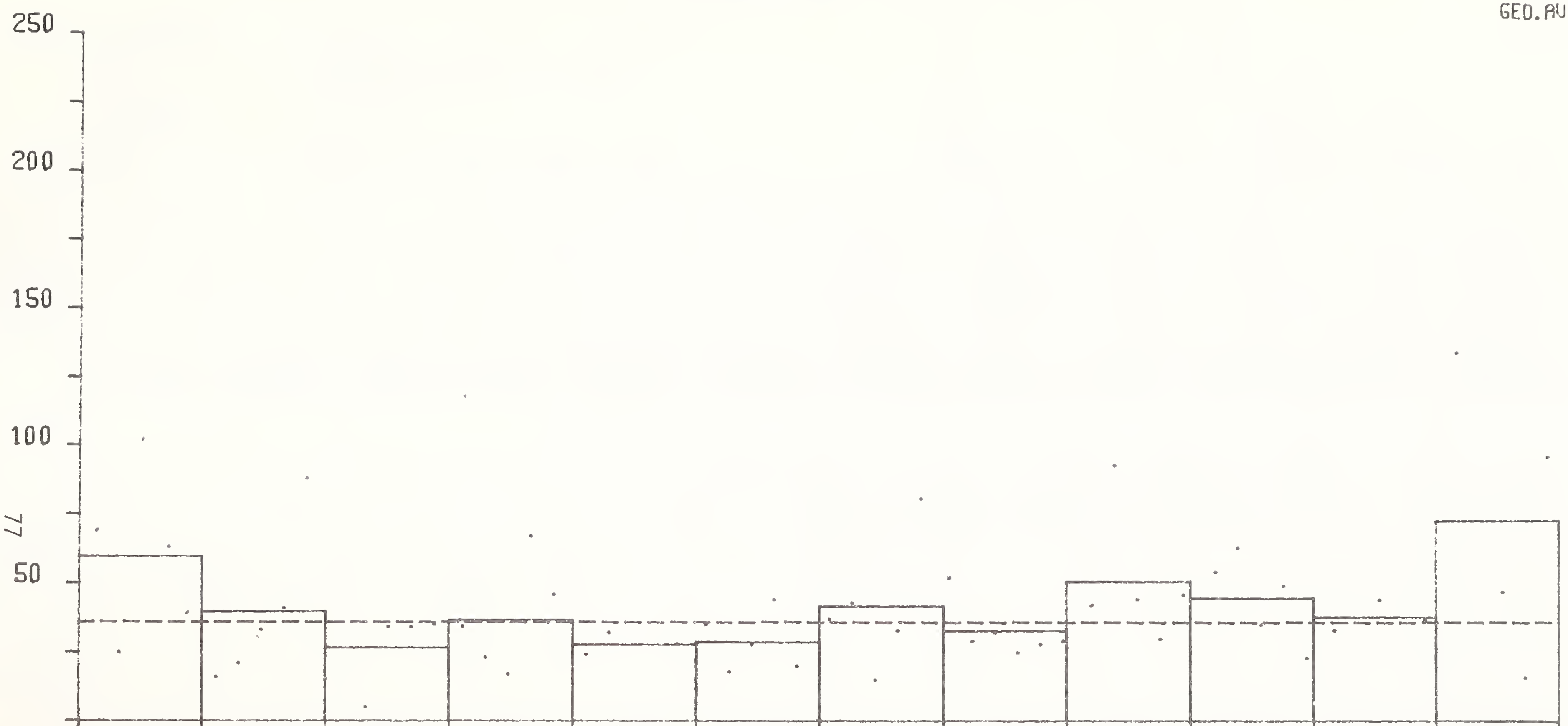
MONTANA STATE AIR QUALITY BUREAU

MAY 18, 1982

TECHNICAL SERVICES

Figure 2-V

1980
GED.AUG = 36



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
NUM-OBS	5	5	4	5	3	5	5	6	5	5	3	4
1-HIGH	102	88	35	67	32	44	81	52	93	63	44	134
2-HIGH	69	41	34	46	28	35	43	32	46	54	37	96
MO.AVG	60	40	27	37	28	29	42	33	51	45	38	73

PLOT. . . . . . . .CONCENTRATION VERSUS TIME
METHOD . . . . . .HI VOL
UNITS . . . . . . .MICROGRAMS/CUBIC METER
STANDARDS . . .(FEDERAL) ANNUAL - 75 UG/CU.M

PARAMETER . . TOTAL SUSPENDED PARTICULATES
AREA. . . . . . .0480, FLATHEAD COUNTY
SITE. . . . . . .036, BIG FORK
CITY. . . . . . .BIG FORK

MONTANA STATE AIR QUALITY BUREAU

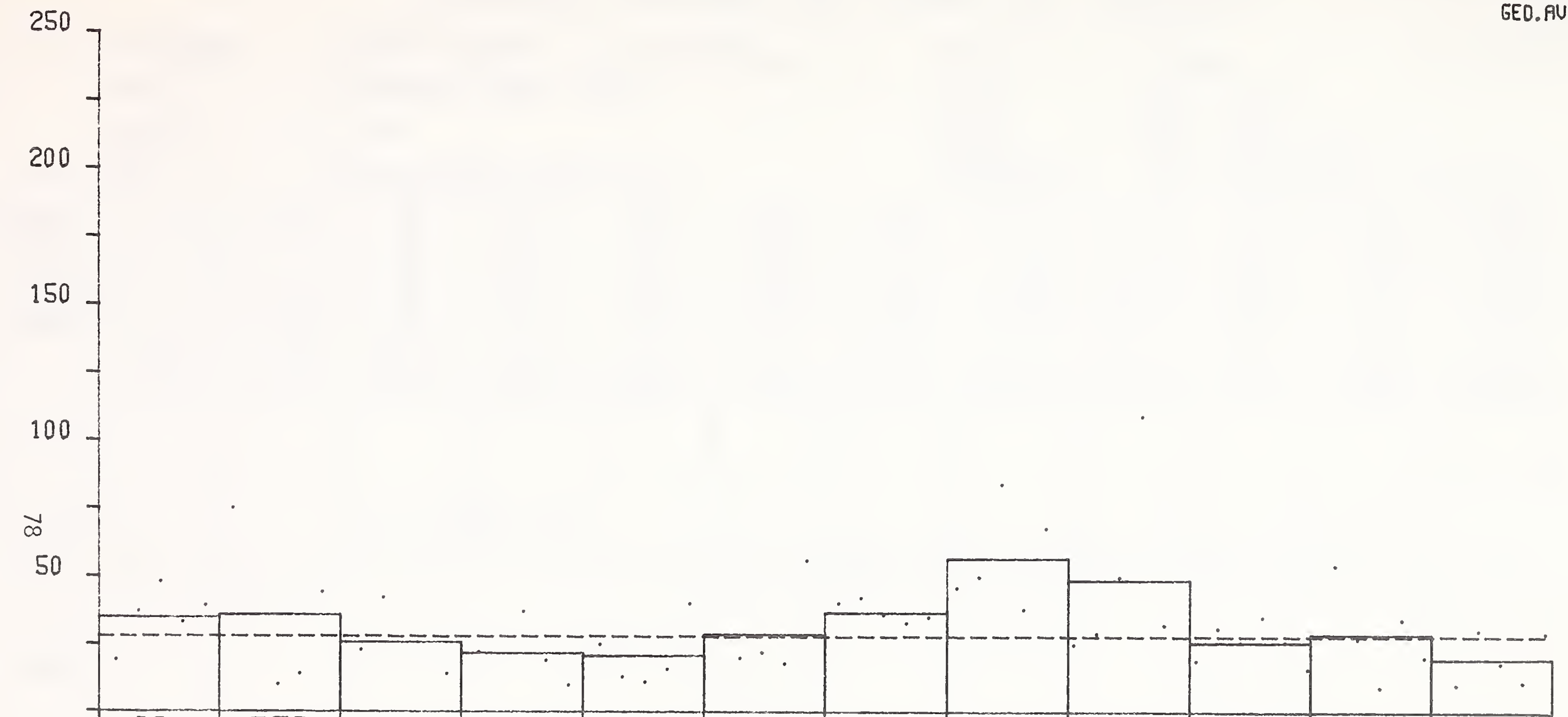
MAY 18, 1982

TECHNICAL SERVICES

Figure 2-W

1981

GEO.AVG = 28



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
NUM-OBS	5	4	3	4	5	5	5	5	5	6	5	5
1-HIGH	48	75	42	37	40	56	42	84	109	35	54	30
2-HIGH	39	44	23	22	25	28	40	68	50	31	34	29
MO.AVG	35	36	26	22	21	29	37	57	49	26	29	20

PLOT. . . . . . . .CONCENTRATION VERSUS TIME
METHOD . . . . . .HI VOL
UNITS . . . . . . .MICROGRAMS/CUBIC METER
STANDARDS . . .(FEDERAL) ANNUAL - 75 UG/CU.M

PARAMETER . . TOTAL SUSPENDED PARTICULATES
AREA. . . . . . .0480, FLATHEAD COUNTY
SITE. . . . . . .036, BIG FORK
CITY. . . . . . .BIG FORK

MONTANA STATE AIR QUALITY BUREAU

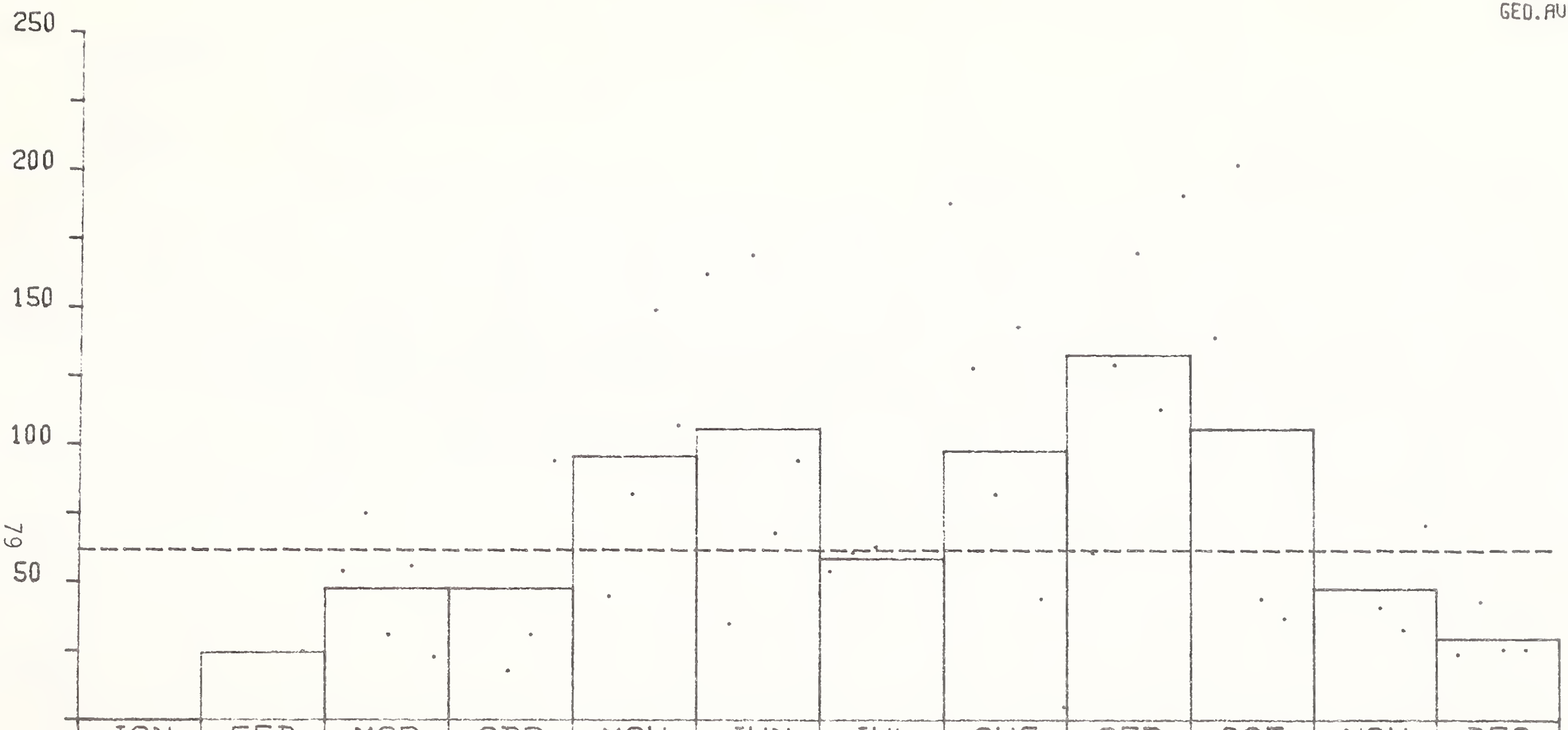
MAY 18, 1982

TECHNICAL SERVICES

Figure 2-X

1979

GEO.AVG = 62



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
NUM-OBS		1	5	3	4	5	3	6	5	4	3	4
1-HIGH		25	75	94	149	169	63	188	191	202	71	43
2-HIGH			56	31	107	162	61	143	170	139	41	26
MO.AVG		25	48	48	96	106	59	98	133	106	48	30

PLOT. . . . . . . .CONCENTRATION VERSUS TIME
METHOD . . . . . .HI VOL
UNITS . . . . . . .MICROGRAMS/CUBIC METER
STANDARDS . . .(FEDERAL) ANNUAL - 75 UG/CU.M

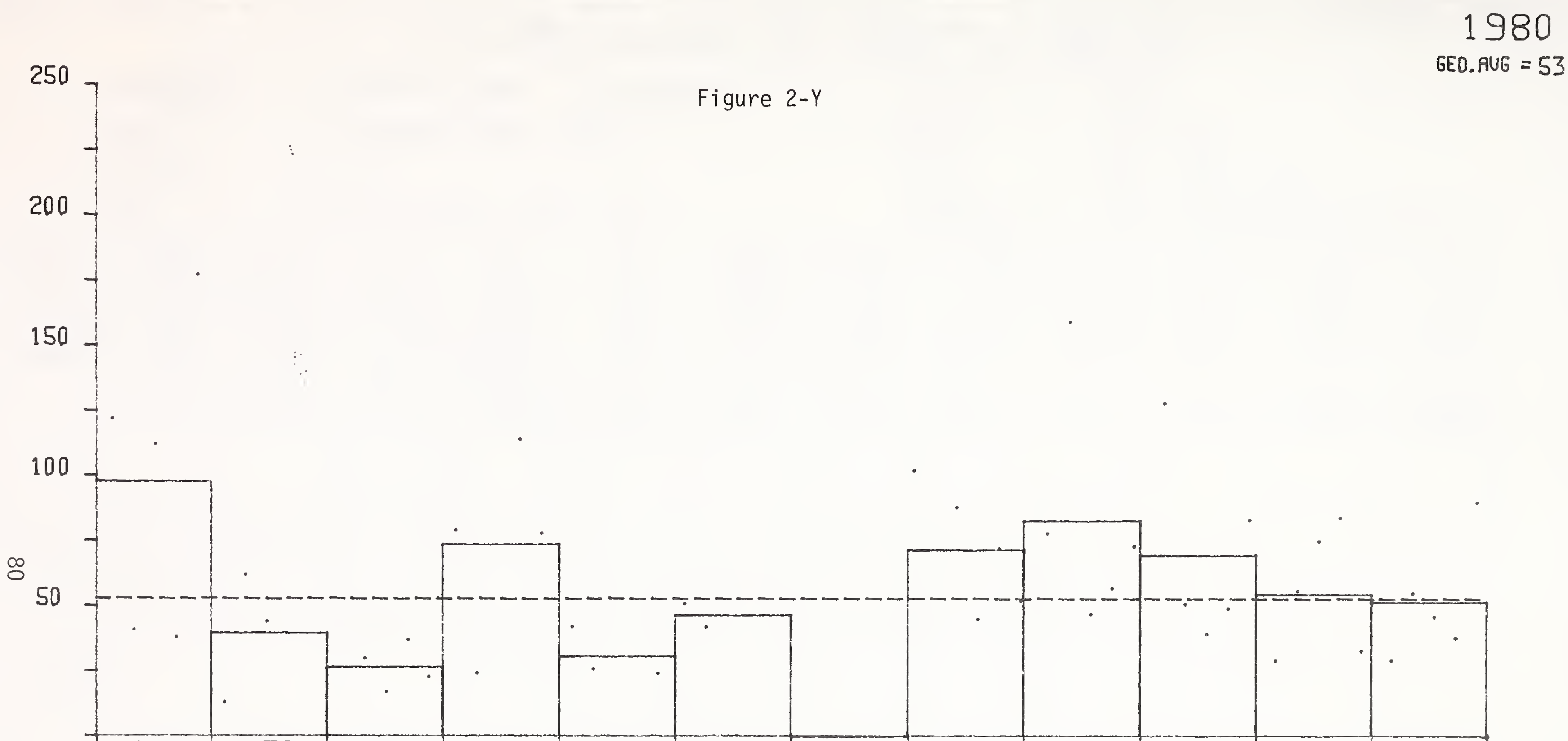
PARAMETER . . TOTAL SUSPENDED PARTICULATES
AREA. . . . . . .0820, LAKE COUNTY
SITE. . . . . . .010, POLSON
CITY. . . . . . .POLSON

MONTANA STATE AIR QUALITY BUREAU

MAY 20, 1982

TECHNICAL SERVICES

Figure 2-Y



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
NUM-OBS	5	3	4	4	3	2		5	5	5	5	5
1-HIGH	177	62	37	114	42	51		102	159	128	84	90
2-HIGH	122	44	30	79	26	42		88	78	83	75	55
MO.AVG	98	40	27	74	31	47		72	83	70	55	52

PLOT. . . . . . . .CONCENTRATION VERSUS TIME
METHOD . . . . . HI VOL
UNITS . . . . . . .MICROGRAMS/CUBIC METER
STANDARDS . . .(FEDERAL) ANNUAL - 75 UG/CU.M

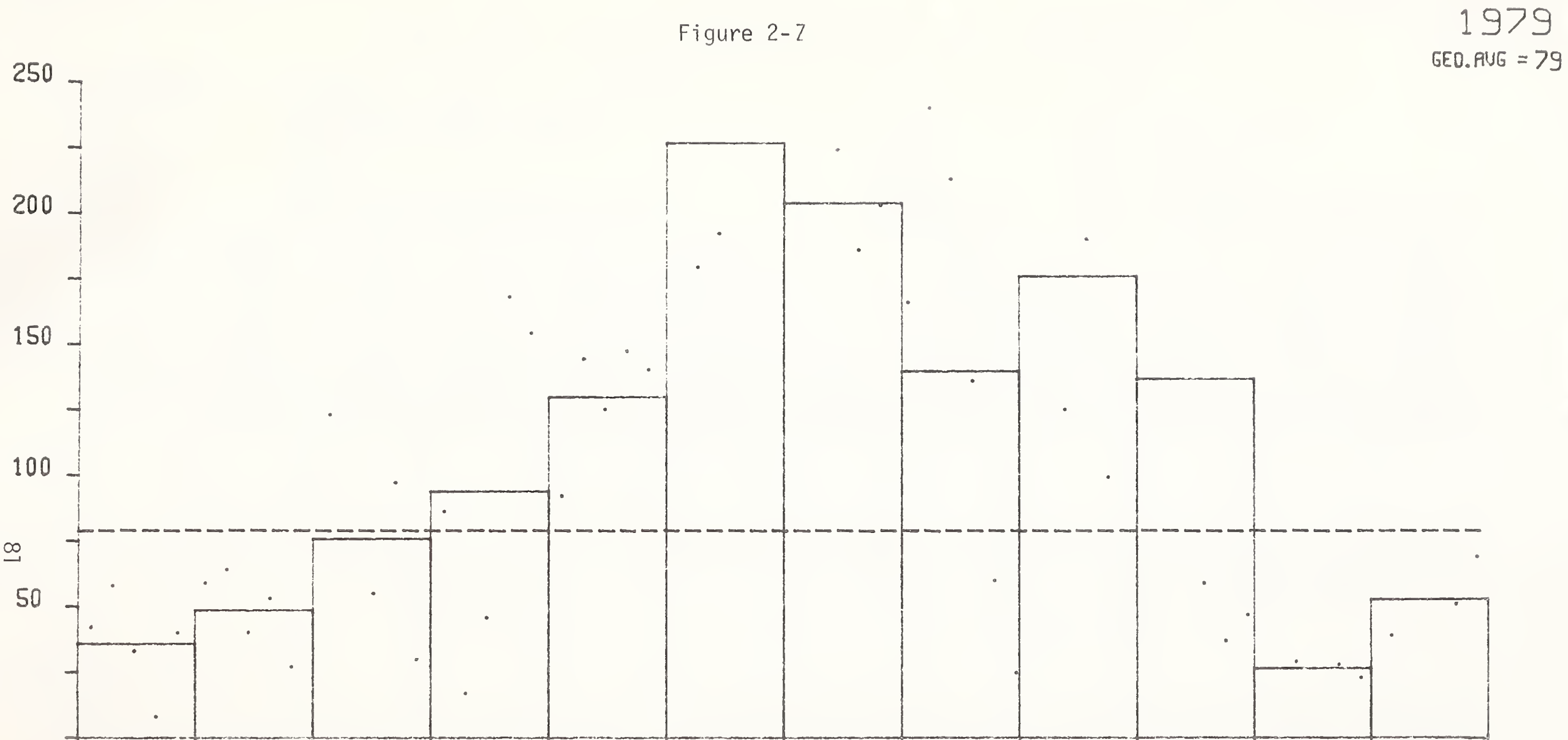
PARAMETER . . TOTAL SUSPENDED PARTICULATES
AREA. . . . . . .0820, LAKE CO
SITE. . . . . . .010, POLSON (MAL)
CITY. . . . . . .POLSON

MONTANA STATE AIR QUALITY BUREAU

MAY 1983

TECHNICAL SERVICES

Figure 2-7



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
NUM-OBS	5	5	4	5	5	3	3	6	4	4	3	3
1-HIGH	58	64	123	168	147	311	224	240	288	406	29	69
2-HIGH	42	59	97	154	144	192	203	213	190	59	28	51
MO.AVG	36	49	76	94	130	227	204	140	176	137	27	53

PLOT. . . . . . . .CONCENTRATION VERSUS TIME
METHOD . . . . . .HI VOL
UNITS . . . . . . .MICROGRAMS/CUBIC METER
STANDARDS . . .(FEDERAL) ANNUAL - 75 UG/CU.M

PARAMETER . . TOTAL SUSPENDED PARTICULATES
AREA. . . . . . .0820, LAKE COUNTY
SITE. . . . . . .011, RONAN
CITY. . . . . . .RONAN

MONTANA STATE AIR QUALITY BUREAU

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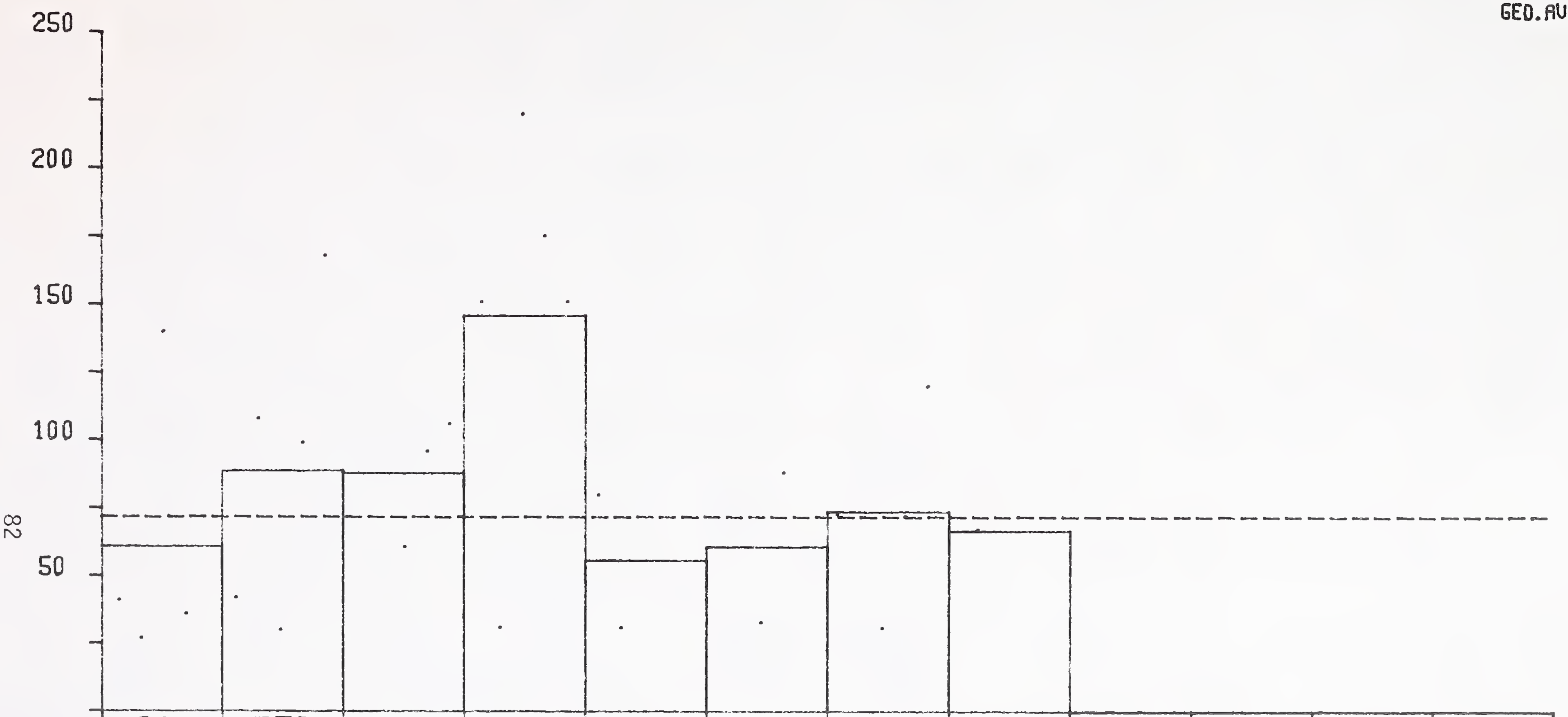
TECHNICAL SERVICES

Figure 2-AA

1980

GEO.AVG = 72



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
NUM-OBS	4	5	3	5	2	2	4	1				
1-HIGH	140	168	106	220	80	88	120	67				
2-HIGH	41	108	96	175	31	33	73					
MO.AVG	61	89	88	146	56	61	74	67				

PLOT. . . . . . . CONCENTRATION VERSUS TIME
METHOD . . . . . HI VOL
UNITS . . . . . . MICROGRAMS/CUBIC METER
STANDARDS . . . (FEDERAL) ANNUAL - 75 UG/CU.M

PARAMETER . . TOTAL SUSPENDED PARTICULATES
AREA. . . . . . .0820, LAKE COUNTY
SITE. . . . . . .011, RONAN
CITY. . . . . . RONAN

MONTANA STATE AIR QUALITY BUREAU

MAY 20, 1982

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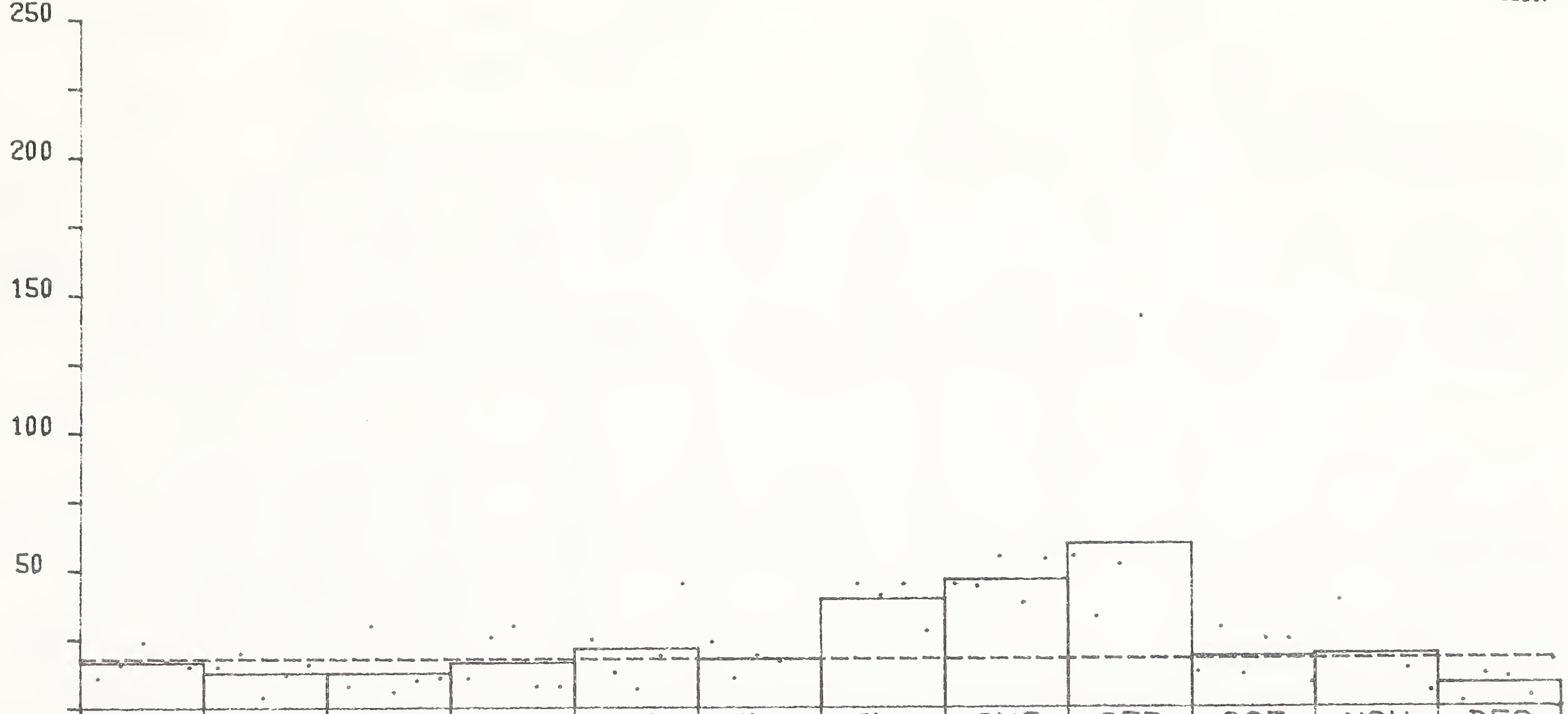
Figure 2-BB

1981
GEO.AVG = 18



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
NUM-OBS	5	5	5	5	5	4	4	5	5	6	3	5
1-HIGH	24	20	30	30	45	24	45	55	142	29	39	17
2-HIGH	17	16	11	26	25	19	45	54	55	25	14	12
MO.AVG	17	13	13	17	22	18	40	47	60	19	20	9

PLOT. . . . . . . .CONCENTRATION VERSUS TIME
METHOD . . . . . .HI VOL
UNITS . . . . . . .MICROGRAMS/CUBIC METER
STANDARDS . . .(FEDERAL) ANNUAL - 75 UG/CU.M

PARAMETER . . TOTAL SUSPENDED PARTICULATES
AREA. . . . . . .0820, LAKE COUNTY
SITE. . . . . . .012, RONAN-NINEPIPES
CITY. . . . . . RONAN

MONTANA STATE AIR QUALITY BUREAU

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